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# HP System Partitions Guide

## Administration for nPartitions

**Revised Second Edition**

**Preliminary HP rp7410 Draft**
**Revision 2.1**

**Please send review comments to: schwartz@rsn.hp.com**

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# Publication History

The publication date and part number indicate this information's current revision level. The publication date will change when a new edition is released. The part number will change when extensive changes are made.

| | |
|---|---|
| Second Edition | December 2001, B2355-90744. CD-ROM, EPSS, and Web (**`http://www.docs.hp.com/`**) delivery.<br><br>Enhancements include coverage of HP rp7410 servers.<br><br>Other additions include details on using HP-UX Processor Sets (Psets) and HP Instant Capacity on Demand (iCOD) on nPartition servers. Other updates throughout. |
| First Edition | September 2001, B2355-90736. CD-ROM, EPSS, and Web (**`http://www.docs.hp.com/`**) delivery.<br><br>Covers HP-UX 11i on HP Superdome and HP rp8400 servers. Online only delivery.<br><br>Revised Version 1.1 includes updates throughout. |

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# Preface

The *HP System Partitions Guide* describes nPartition administration and operations: the commands, procedures, concepts, and principles for configuring, monitoring, and maintaining nPartition system environments.

This edition covers HP rp7410 servers, HP rp8400 servers and HP Superdome servers, including Superdome I/O Expansion cabinets.

### Summary of Recent Changes

This is a revised Second Edition of *HP System Partitions Guide: Administration for nPartitions* that has HP rp7410 server details. Other recent additions include updates throughout and information for managing Psets and iCOD on nPartition servers.

### Reader Comments and Feedback

Hewlett-Packard welcomes your feedback on this publication. Please address your responses to `edit@presskit.rsn.hp.com` and note that you will not receive an immediate reply. All comments are appreciated.

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# Notational Conventions

The following notational conventions are used in this publication.

- `Commands and options` are represented using `this font`.
- **`Text to be typed by users`** is represented using **`this font`**.
- *`Text to be replaced with text the user supplies`* is represented using *`this font`*.

  Example:
  "Enter the `ls -l` *`filename`* command" means you must replace *`filename`* with your own text.

- **Keyboard keys and graphical interface items (such as buttons, tabs, and menu items)** are represented using **this font**.

  Examples:
  The **Control** key, the **OK** button, the **General** tab, the **Options** menu.

- **Menu —> Submenu** represents a menu selection to be performed by the user.

  Example:
  "Select the **Partition —> Create Partition** action" means you must select the **Create Partition** menu item from the **Partition** menu.

- `Example screen output` is represented using `this font`.

**NOTE** A note highlights useful information such as restrictions, recommendations, or important details about HP product features.

**CAUTION** A caution provides information required to avoid losing data or avoid losing system functionality.

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# Related Information

You can find other information on general HP-UX 11i administration and nPartition server management in the following publications:

- HP Technical Documentation Web Site

  **`http://www.docs.hp.com`**

- HP-UX 11i Information

  *Managing Systems and Workgroups: A Guide for HP-UX System Administrators*

  *HP-UX 11i Release Notes*

  **`http://docs.hp.com/hpux/os/11i/index.html`**

  Information in the /usr/share/doc directory.

- HP Server Hardware Information

  *Installation Guide: HP Server rp8400*

  *Site Preparation Guide: HP rp8400 Servers*

  *I/O Expansion Cabinet Guide For Superdome Servers*

  **`http://superdome.hp.com/`**

  **`http://docs.hp.com/hpux/hw/index.html`**

- HP Superdome Server—First HP-UX 11i Release

  *Managing Superdome Complexes: A Guide for HP-UX System Administrators* documents the concepts and procedures for managing nPartitions on Superdome servers running the original (January 2001) HP-UX 11i release.

All titles are available through the **`http://www.docs.hp.com`** Web site.

For current HP-UX 11i nPartition administration details refer to this publication, the *HP System Partitions Guide*.

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# 1 Overview

This chapter introduces Hewlett-Packard's nPartition server solutions, covers HP-UX 11i operating system features for nPartitions, and presents an overview of HP server support for nPartitions.

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# Introduction to nPartition System Features

Hewlett-Packard's nPartition system capabilities enable you to configure a single server complex as one large system or as multiple smaller systems.

Each nPartition definition establishes a subset of the server hardware resources that are used as a system environment for booting a single instance of HP-UX. An nPartition includes: one or more *cells* (containing processors and memory) that are assigned to the partition as well as all *I/O chassis* connected to those cells.

All processors, memory, and I/O in an nPartition are used exclusively by software running in the partition. Thus, each nPartition runs its own instance of the Boot Console Handler (BCH) interface and HP-UX.

By defining multiple nPartitions within an nPartition server, you establish hardware partitioning that enables a single server complex to run multiple instances of the HP-UX 11i operating system.

The HP-UX 11i December 2001 release supports nPartitions on the following servers:

- HP rp7410 server (`model` string: 9000/800/rp7410)
- HP rp8400 server (`model` string: 9000/800/S16K-A)
- HP Superdome 16-way (`model` string: 9000/800/SD16000)
- HP Superdome 32-way (`model` string: 9000/800/SD32000)
- HP Superdome 64-way (`model` string: 9000/800/SD64000)

You can reconfigure a server's nPartition definitions without physically modifying the server's hardware configuration by using HP's software-based nPartition management tools.

You can reconfigure any nPartition to include more, fewer, and/or different hardware resources. Doing this requires shutting down the operating system running in the partition and resetting the nPartition to reconfigure it; this *reboot for reconfig* operation is performed using the `shutdown -R` HP-UX command (using the `-R` option, not `-r`).

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## Administration Tools for nPartitions

You can use several administration tools to manage nPartitions in a server complex, including the service processor, consoles, Boot Console Handler (BCH) interfaces, HP-UX commands, and Partition Manager.

- Server complex's **service processor**, which including the Command menu, partition consoles, partition Virtual Front Panels, partition Console Logs, and the Chassis Log viewer.
- Hard **partition console and BCH interface**, which provide console access (through the service processor) as well as interactive control before HP-UX has booted on an nPartition.
- **HP-UX nPartition commands** (including `parstatus`, `parcreate`, `parmodify`, and others) enable you to list, monitor, configure, and manage nPartitions from HP-UX.
- The **Partition Manager** utility (`/opt/parmgr/bin/parmgr`) provides a graphical interface for listing and managing nPartitions.

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## Server Hardware Support for nPartitions

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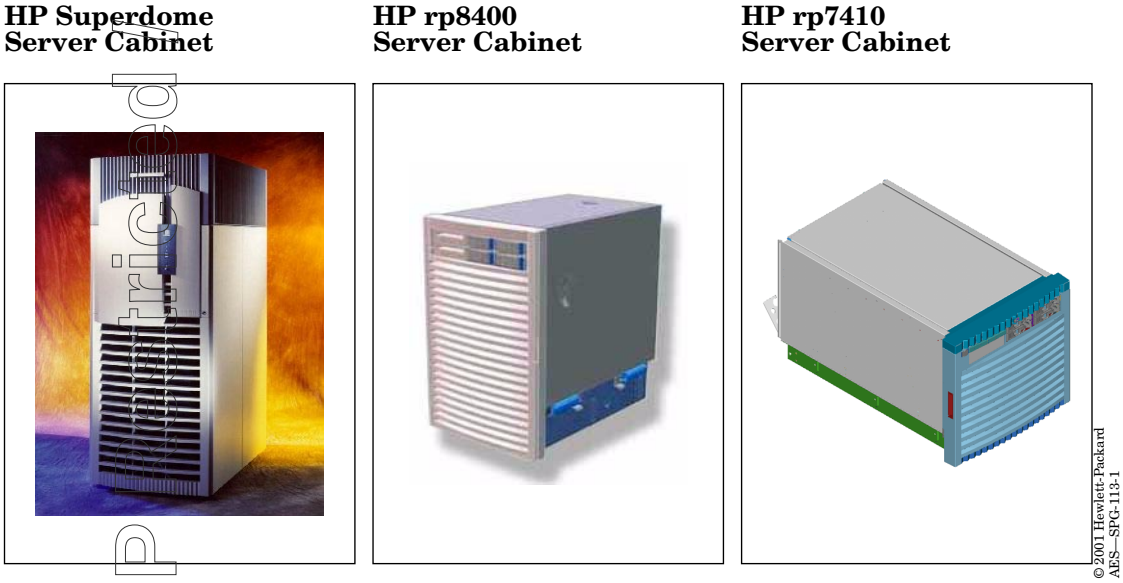
Three Hewlett-Packard servers support nPartitions: HP Superdome, HP rp8400, and HP rp7410 servers.

These HP nPartition servers provide highly configurable, high-performance HP-UX system environments. HP Superdome, HP rp8400, and HP rp7410 server cabinets are shown in Figure 1-1.

**Figure 1-1 HP nPartition Server Cabinets**




Within each HP nPartition **server cabinet** are multiple **cells**, each of which contains processors and memory. Each server cabinet also may have multiple **I/O chassis** that provide PCI slots for I/O cards. Each I/O chassis connects to one of the cells in the server.

HP Superdome servers also support **I/O expansion cabinets** to provide additional I/O chassis.

All hardware within a server—including all cells, I/O chassis, cables, cabinet hardware, and power and utilities components—is considered to be a **server complex**.

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An HP Superdome complex can consist of one cabinet or two server cabinets, and can also include one or two I/O expansion cabinets (to provide additional I/O chassis).

Each HP rp8400 or HP rp7410 server complex consists of a single cabinet only.

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# Supported HP Server Models

The HP servers that support nPartitions include the HP rp7410 server (see *HP rp7410 Server Model*), the HP rp8400 server (see *HP rp8400 Server Model*), and three models of HP Superdome servers (see *HP Superdome Server Models* on page 24).

These nPartition servers have different hardware configurations and limits, as described in the following sections, and both include support for nPartitions.

## HP rp7410 Server Model

HP rp7410 servers are first supported by the HP-UX 11i December 2001 release. HP rp7410 servers scale from one to two cells and include complete support for hard partitions (nPartitions).

You can configure a single nPartition using one or both cells, or can configure up to 2 separate nPartitions within an HP rp7410 server complex.

In a two-partition HP rp7410 complex, you would use cell 0 and its core I/O in one nPartition, and use cell 1 and its core I/O in the other nPartition.

The HP rp8400 server model includes these features:

- *A single server cabinet* that includes all cells, I/O chassis, processors, memory, PCI cards, and core I/O.
- *Either 1 or 2 cells*, each with up to 4 PA-RISC processors and up to 16 DIMMs.
- *Two PCI I/O chassis* that share the same chassis hardware.

  One I/O chassis is connected to cell 0, the other is connected to cell 1.

  Each I/O chassis has 8 PCI card slots, numbered from 1 to 8.

**NOTE**

On HP rp7410 servers, two PCI slots by convention are dedicated for use by a combination LAN/SCSI card: PCI domain 0 slot 1 (the first slot on the left) and PCI domain 1 slot 8 (the last slot on the right).

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- *Up to 2 core I/O devices*, one connected to cell 0, and the other connected to cell 1.
- *A total server complex capacity of*: 2 cells, 8 processors, 32 DIMMs, and 16 PCI card slots.
- The model string for HP rp7410 servers is `9000/800/rp7410`.

HP rp7410 servers include a single server cabinet.

## HP rp8400 Server Model

HP rp8400 servers are scalable systems that, like HP Superdome and HP rp7410 servers, allow you a tremendous amount of configurability. While HP rp8400 servers have a smaller capacity than Superdome servers, they include the same features for adapting the server resources to your needs.

HP rp8400 servers include complete support for hard partitions (nPartitions). You can configure a single nPartition using some or all cells, or can configure up to 2 separate nPartitions within an HP rp8400 server complex.

In a multiple-partition HP rp8400 complex, you would use cell 0 and its core I/O in one nPartition, and use cell 1 and its core I/O in the other nPartition. Any other cells (cells 2 and 3) could be assigned to either of the two nPartitions, or could be unassigned.

The HP rp8400 server model includes these features:

- *A single server cabinet* that includes all cells, I/O chassis, processors, memory, PCI cards, and core I/O.
- *From 1 to 4 cells*, each with up to 4 PA-RISC processors and up to 16 DIMMs.
- *Two PCI I/O chassis* that share the same chassis hardware.

  One I/O chassis is connected to cell 0, the other is connected to cell 1.

  Each I/O chassis has 8 PCI card slots, numbered from 1 to 8.
- *Up to 2 core I/O devices*, one connected to cell 0, and the other connected to cell 1.
- *A total server complex capacity of*: 4 cells, 16 processors, 64 DIMMs, and 16 PCI card slots.
- The model string for HP rp8400 servers is `9000/800/S16K-A`.

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HP rp8400 servers include a single server cabinet.

## HP Superdome Server Models

HP Superdome servers are highly scalable systems that allow you a tremendous amount of configurability to adapt the server resources to meet your particular hardware and software needs.

HP Superdome servers include complete support for HP-UX hardware partitions (nPartitions). You can configure a single nPartition using some or all cells, or can configure multiple nPartitions within the same Superdome server complex (up to one nPartition for each cell that has core I/O attached).

You can add up to two Superdome I/O expansion cabinets to the Superdome 32-way and 64-way models. Each I/O expansion cabinet has up to 6 additional 12-slot I/O chassis.

The three Superdome models include:

- **Superdome 16-way**—This single-cabinet server has from 2 to 4 cells, each with 4 HP PA-RISC processors and up to 32 DIMMs.

  The Superdome 16-way server can have up to 16 processors, 128 DIMMs, and up to 4 12-slot PCI I/O chassis.

  The model string for Superdome 16-way servers is `9000/800/SD16000`.

- **Superdome 32-way**—This single-cabinet server has from 2 to 8 cells, each with 4 HP PA-RISC processors and up to 32 DIMMs.

  The Superdome 32-way server can have up to 32 processors, 256 DIMMs, up to 4 internal 12-slot PCI I/O chassis, plus optional I/O expansion cabinet hardware.

  The model string for Superdome 32-way servers is `9000/800/SD32000`.

- **Superdome 64-way**—This tightly interconnected dual-cabinet server has from 4 to 16 cells, each with 4 HP PA-RISC processors and up to 32 DIMMs.

  The Superdome 64-way server can have up to 64 processors, 512 DIMMs, and up to 8 internal 12-slot PCI I/O chassis. (Each of the two cabinets in a Superdome 64-way server provides up to 32 processors, 256 DIMMs, and up to 4 12-slot PCI I/O chassis.) HP

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Superdome 64-way servers also can have optional I/O expansion cabinet hardware.

The model string for Superdome 64-way servers is `9000/800/SD64000`.

With HP's Superdome servers you can start with a system that meets your needs now, and add more components as your needs increase.

You can add components (cells and I/O chassis) to your existing system as needs arise, and can also upgrade to larger-capacity systems as needed. A Superdome 16-way server can be upgraded to a Superdome 32-way server, and likewise the Superdome 32-way server can be upgraded to Superdome 64-way server.

You can add I/O expansion cabinets to a Superdome server at any time.

### HP Superdome I/O Expansion Cabinet

HP Superdome 32-way and Superdome 64-way servers can include I/O expansion cabinets in addition to the server cabinet(s) in the complex.

Each I/O expansion cabinet has a cabinet number of either 8 or 9.

A Superdome I/O expansion cabinet includes up to 3 I/O bays, with two 12-slot I/O chassis in each bay. This provides for up to 6 chassis with a total of 72 PCI card slots in each I/O expansion cabinet.

Each I/O expansion cabinet has its own power supplies, fans, and utilities (which are connected to the Superdome server's service processor bus).

The I/O chassis (and PCI card slots) within each I/O expansion cabinet are made available to nPartitions through direct I/O chassis-to-cell connections—exactly as internal Superdome server cabinet I/O chassis are connected to cells.

Refer to the *I/O Expansion Cabinet Guide* for details.

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# HP-UX Hardware Paths for nPartitions

The HP-UX hardware path for nPartition systems is provided in the format described here.

The `/usr/sbin/ioscan` HP-UX command reports the hardware path for active components within the partition in which the command is issued. You also can use the `/usr/bin/rad -q` command to list details about active I/O slots and cards in the local nPartition.

**NOTE**

The `ioscan` and `rad` commands only report information about the *currently active* hardware components *in the local partition*. They do not report details for hardware not assigned to the local partition or inactive hardware in the partition.

The components of nPartition hardware paths are:

`a/b/c/d/e.f.g`

where these components are as follows

- `a`

  Is the global cell number.

- `b`

  Is a processor (10–13), memory (5), or a system bus adapter (0). Each I/O chassis has a single system bus adapter.

- `c`

  Is a local bus adapter (the *LBA*, one for each PCI card slot in the chassis). The LBA connects its corresponding PCI card slot with the system bus adapter.

**NOTE**

The LBA number *is not necessarily the same* as the PCI slot number.

Use the `rad -q` command to list all active PCI slots in a partition along with their corresponding hardware paths. See *PCI Card Slot and Hardware Path Numbering* on page 28.

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- `d`

  Is the card's address on the slot's PCI bus.

  Typically this is 0 (zero), although the core I/O card has multiple devices and addresses in a single card.

- `e`

  Is the function for the I/O card. Typically this is 0 (zero) for single-function cards.

- `f`

  Is the target of the I/O device, or SCSI ID.

- `g`

  Is a device-specific address such as a SCSI controller (initiator).

Refer to the *ioscan* (1M) manpage for details on using `ioscan` to list hardware path information.

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## PCI Card Slot and Hardware Path Numbering

On nPartition servers, the PCI card slot numbers (within an I/O chassis) are not necessarily the same as their *local bus adapter* (LBA) number, such as is reported by the `ioscan` or `rad` HP-UX commands.

Table 1-1 shows the correlations among PCI slots and their LBA numbers.

**Table 1-1 Numbering of PCI slots and Busses (LBAs)**

| PCI Card Slot | HP Superdome LBA Number | HP rp8400 and HP rp7410 LBA Number |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 1 | 8 |
| 2 | 2 | 10 |
| 3 | 3 | 12 |
| 4 | 4 | 14 |
| 5 | 6 | 6 |
| 6 | 14 | 4 |
| 7 | 12 | 2 |
| 8 | 11 | 1 |
| 9 | 10 | — |
| 10 | 9 | — |
| 11 | 8 | — |

For an example, issue the **`ioscan -C ba`** command to lists the PCI slots (“Local PCI Bus Adapter”) for your partition.

The order in which `ioscan` reports the PCI slots (in LBA number order) *does not* correspond to the order in which the slots physically are arranged (PCI card slot order, left to right).

The `rad -q` command lists each active PCI slot, its associated HP-UX hardware path, and other slot details.

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# rad Command Output in nPartitions

This section covers the `rad` command's output on nPartitions. For complete details refer to the *rad* (1M) manpage.

**NOTE**

When adding or replacing I/O cards use the SAM (`/usr/sbin/sam`) procedures, when possible, rather than equivalent `rad` command procedures.

See also the *sam* (1M) and *rad* (1M) manpages.

On HP nPartition servers, the `rad` command reports PCI card slot details as shown in the following example output. The `rad` command reports each available PCI slot (*`cabinet-bay-chassis-slot`*), its corresponding HP-UX hardware path (*`cell/sba/lba/device`*), and more details.

```
# rad -q
                                                                  Driver(s)
Slot        Path        Bus   Speed   Power   Occupied   Suspended   Capable
0-0-1-0     0/0/0       0     33      On      Yes        No          No
0-0-1-1     0/0/1/0     8     33      On      Yes        No          Yes
0-0-1-2     0/0/2/0     16    33      On      Yes
0-0-1-3     0/0/3/0     24    33      On      Yes
0-0-1-4     0/0/4/0     32    33      On      Yes
0-0-1-5     0/0/6/0     48    66      On      Yes
0-0-1-6     0/0/14/0    112   33      On      No
0-0-1-7     0/0/12/0    96    33      On      No         N/A         N/A
0-0-1-8     0/0/11/0    88    33      On      Yes        No          Yes
0-0-1-9     0/0/10/0    80    33      On      No         N/A         N/A
0-0-1-10    0/0/9/0     72    33      On      No         N/A         N/A
0-0-1-11    0/0/8/0     64    33      On      Yes        No          Yes
0-1-3-0     2/0/0       0     33      On      Yes        No          No
0-1-3-1     2/0/1/0     8     33      On      Yes        No          Yes
0-1-3-2     2/0/2/0     16    33      On      Yes        No          Yes
0-1-3-3     2/0/3/0     24    33      On      Yes        No          Yes
0-1-3-4     2/0/4/0     32    33      On      No
0-1-3-5     2/0/6/0     48    66      On      No
0-1-3-6     2/0/14/0    112   66      On      Yes
0-1-3-7     2/0/12/0    96    33      On      No
0-1-3-8     2/0/11/0    88    33      On      Yes
0-1-3-9     2/0/10/0    80    33      On      No         N/A         N/A
0-1-3-10    2/0/9/0     72    33      On      No         N/A         N/A
0-1-3-11    2/0/8/0     64    33      On      Yes        No          Yes
#
```

Cabinet 0, Bay 0, Chassis 1, Slot 3
(`rad` slot notation: 0-0-1-3)

Cell 2, SBA 0, LBA 6, Device 0
(HP-UX hardware path: 2/0/6/0)

The `rad` command only lists slots in PCI chassis that are assigned to the local nPartition and are active.

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# Getting Product Licensing Information

When you license a software product to run on an HP system you may need to provide machine or system details to the software vendor as part of the software registration process.

This section describes how to obtain information you may need when licensing non-HP software to run on an HP nPartition server.

For complete information about software product licensing, refer to the company that manufactures or sells the software you plan to use.

To license software for use on HP-UX running on an nPartition, you may need to provide the following details about the partition or its server complex:

- **Unique Machine (Complex) Identifier**

  `/usr/bin/getconf _CS_MACHINE_IDENT`

- **Unique nPartition Identifier**

  `/usr/bin/getconf _CS_PARTITION_IDENT`

- **Machine (Complex) Serial Number**

  `/usr/bin/getconf _CS_MACHINE_SERIAL`

  `/usr/sbin/parstatus -X`

- **Server (Complex) Product Number**

  `/usr/sbin/parstatus -X`

- **Hardware (Complex) Model String**

  `/usr/bin/model`

- **HP-UX Version and Installed Bundles**

  For the HP-UX version: `/usr/bin/uname -r`

  For all bundles installed: `/usr/sbin/swlist -l bundle`

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## nPartition Unique Identifiers

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**NOTE**

Use the `getconf` command or the `confstr()` call to obtain unique machine and partition ID information. Do not use the `uname -i` command, which *does not report unique IDs* for nPartition systems.

In order to guarantee compatibility on current and future platforms use the interfaces to *getconf* (1M) and *confstr* (3C) to retrieve unique machine identifiers.

The interfaces include the `_CS_PARTITION_IDENT` and `_CS_MACHINE_IDENT` parameters:

- For a *nPartition-specific* unique ID use this command:

  **`/usr/bin/getconf _CS_PARTITION_IDENT`**

- For a *complex-specific* unique ID use this command:

  **`/usr/bin/getconf _CS_MACHINE_IDENT`**

The complex and partition unique IDs are based, in part, on the machine serial number.

To retrieve the machine serial through these interfaces, specify the `_CS_MACHINE_SERIAL` parameter to them.

See the *confstr* (3C) manpage for details on these parameters and their use.

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# HP-UX 11i Release Features

The *HP-UX 11i Release Notes* lists the latest feature additions and changes to HP-UX operating system and the various "operating environment" bundles. A copy of the release notes is installed in /usr/share/doc directory; see the 11iRelNotes.txt or 11iRelNotes.html file.

Each of the HP-UX operating environment bundles includes its own collection of applications. You can install any *one* of the operating environments on an nPartition. Use the `swlist -l bundle` command to list all installed software bundles, including operating environments.

The HP-UX 11i operating environments are:

- HP-UX 11i Operating Environment

  This is an integrated and tested software solution for servers. It contains the base HP-UX 11i operating system and selected drivers and applications.

- HP-UX 11i Enterprise Operating Environment

  This is an operating environment marketed and supported only for commercial servers. It contains everything in the basic HP-UX 11i Operating Environment plus additional applications.

- HP-UX 11i Mission Critical Operating Environment

  This is an operating environment marketed and supported only for commercial servers. It contains everything in the HP-UX 11i Enterprise Operating Environment plus additional applications.

- HP-UX 11i Technical Computing Environment

  This is an operating environment marketed and supported for technical computing servers and workstations. It contains the base HP-UX 11i operating system and selected drivers and applications.

- HP-UX 11i Minimal Technical Operating

  This is an operating environment defined for HP workstations. It contains all the base functionality. However, compared to the Technical Computing Operating Environment, the set of additional applications is greatly reduced.

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The *Read Before Installing or Updating HP-UX 11i* booklet, which is distributed with HP-UX media, also has current details on release and operating environment features.

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# 2 Introduction to nPartitions

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This chapter describes HP's nPartition features and presents related concepts and guidelines for managing nPartitions.

For procedures related to managing nPartitions, refer to *Procedures for Managing nPartitions* on page 195.

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# Overview of nPartitions

On HP's nPartition servers, each nPartition is a "logical system" that has its own dedicated portion of the server hardware that can run a single instance of the HP-UX 11i operating system. Each nPartition can boot, reboot, and operate independently of any other partitions and hardware within the same server complex.

Each nPartition has one or more **cells** (containing processors and memory) that are assigned to the partition for its exclusive use. Any **I/O chassis** that is attached to a cell belonging to a partition also is assigned to the partition. (Each chassis has PCI card slots plus any I/O cards and attached devices, and may also have **core I/O**.)

The **server complex** includes all hardware within an nPartition server: all cabinets, cells, I/O chassis, I/O devices and racks, management and interconnecting hardware, power supplies, and fans.

You can configure one or more nPartitions within a server complex, allowing the hardware to function as a single HP-UX 11i system or as many systems.

The following concepts and issues related to nPartitions are introduced in the rest of this section:

- *Properties of Cells* on page 37
- *Genesis Partition* on page 39
- *Partition Numbers* on page 40
- *Local and Remote nPartitions* on page 40
- *Active and Inactive nPartitions* on page 41

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## Properties of Cells

Cells in an HP nPartition server have various properties that determine how the cells can be used and managed.

The cell properties discussed here include: *Assigned and Unassigned Cells*, *Base Cells*, *Core Cells*, and *Active and Inactive Cells*.

To list details about all cells in a server complex you can use the `parstatus -C` command. The command output includes the current partition assignments, usage, and I/O details for the cells.

```
# parstatus -C
[Cell]
                        CPU     Memory                                  Use
                        OK/     (GB)                            Core    On
Hardware    Actual      Deconf/ OK/                             Cell    Next Par
Location    Usage       Max     Deconf    Connected To          Capable Boot Num
==========  ==========  ======= ========= ==================== ======= ==== ===
cab0,cell0 active core  4/0/4    8.0/ 0.0 cab 0,bay0,chassis1 yes     yes  0
cab0,cell1 active base  4/0/4    8.0/ 0.0 -                   no      yes  0
cab0,cell2 active base  4/0/4    8.0/ 0.0 cab 0,bay1,chassis3 yes     yes  0
cab0,cell3 absent       -       -         -                    -       -    -
cab0,cell4 active core  2/0/4    4.0/ 0.0 cab 0,bay0,chassis3 yes     yes  1
cab0,cell5 active base  2/0/4    4.0/ 0.0 -                   no      yes  1
cab0,cell6 active base  2/0/4    4.0/ 0.0 cab 0,bay1,chassis1 yes     yes  1
cab0,cell7 absent       -       -         -                    -       -    -

#
```

### Assigned and Unassigned Cells

Each cell in an nPartition server complex either is *assigned* to one of the partitions in the complex, or it is *unassigned* and thus is not used by any of the partitions. If an I/O chassis is attached to an unassigned cell then the chassis likewise is not assigned to a partition.

Cells that are unassigned are considered to be available resources; they are on the server complex's "free cell list" and are free to be assigned to any of the existing partitions, or can be used to create new partitions.

### Base Cells

For the HP-UX 11i release all cells within a partition are **base cells**.

When you create partitions and assign cells to partitions using HP-UX 11i utilities, you specify that the cells are base cells. The default cell type is base cell, so when you use utilities and do not explicitly specify a cell type the cell will be of type base. If in the future other cell types are supported then the utilities will allow you to specify the cell type.

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### Core Cells

One cell in each nPartition must serve as the **active core cell**. The core cell is a cell that is connected to an I/O chassis that has **core I/O** attached.

The core cell controls the partition until HP-UX has booted and provides access to the nPartition's console. The core cell's core I/O is used and a processor on the core cell runs the Boot Console Handler (BCH) code while all other processors are idle until HP-UX is booted.

Although a partition can have multiple **core-capable cells** (any cell that has an I/O chassis and core I/O attached), only one core I/O is actively used in a partition (the one belonging to the active core cell).

To be *eligible* as a core cell, a cell must be assigned to the partition, it must be active, and it must be attached to an I/O chassis containing functional core I/O.

By default—on HP Superdome and HP rp8400 servers—the lowest numbered eligible cell in a partition is selected as the core cell.

By default on HP rp7410 servers only, cell 1 is selected as the core cell if it is eligible.

You can define up to four **core cell choices** for a partition. The core cell choices are cells that you prefer to be selected as the partition's core cell. If your first core cell alternate cannot serve as the core cell then the partition attempts to select any remaining core cell choices, trying them in the order that you specified.

When none of the core cell choices can serve as the active core cell, the partition then attempts to select an eligible cell starting with the lowest numbered active cell.

### Active and Inactive Cells

Cells that are assigned to an nPartition and have booted to form a partition are **active cells** whose resources (processors, memory, and any attached I/O) can be actively used by software running in the partition.

Cells that are **inactive** either are not assigned to an nPartition, or they have not participated in *partition rendezvous* to form a partition with any other cells assigned to the partition. (Partition rendezvous is the point during the partition boot process when all available cells in an nPartition join together to establish which cells are active for the current boot of the partition.)

For example, a cell can be inactive when it is powered off, has booted with a "n" use-on-next-boot value, or is assigned to a partition that has been reset to a ready for reconfig state.

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The resources belonging to inactive cells are not actively used by a partition. For a cell's resources to be actively used the cell must boot and participate in partition rendezvous.

## Genesis Partition

The **Genesis partition** is the initial, one-cell nPartition created within a server complex. The Genesis partition is *just like any other nPartition* except in how it is created.

If your server complex has its nPartitions pre-configured by HP, you do not need to create a Genesis partition.

However, you always have the option of creating a Genesis partition by using the service processor (GSP or MP) Command menu's `CC` command, `G` option, to "wipe out" any existing nPartition definitions and start a new complex configuration that includes only the Genesis partition.

You can use HP-UX utilities running on the Genesis partition as the method for configuring all nPartitions in the complex. The Genesis partition always is partition number 0.

When it is first created, the Genesis partition consists of one cell that is connected to an I/O chassis that has core I/O installed. The Genesis partition also must have a bootable disk (or a disk onto which you can install HP-UX).

If HP-UX is not installed on the Genesis partition's disk(s), you can boot the Genesis partition to the Boot Console Handler (BCH) menu and from that point install HP-UX. This installation requires either having access to an HP-UX install server, or a CD-ROM drive (or DVD-ROM drive) connected to the cell's I/O chassis.

After you boot HP-UX on the Genesis partition, you can modify the partition to include additional cells. You also can create other, new nPartitions and can modify them from the Genesis partition or any other partition running HP-UX.

Note that—once you create additional partitions—you do not necessarily have to use the Genesis partition to perform your partition management and configuration tasks.

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## Partition Numbers

Each nPartition has its own unique **partition number** that the partition commands and utilities use for identifying the nPartition.

When you create an nPartition, the utility you use assigns the partition the lowest available partition number. For example, the Genesis partition always is partition number 0 because it is the first and only nPartition in the server complex when it is created, and the second partition to be created is partition number 1.

After you remove an nPartition, no cells are assigned to the partition. As a result, the partition tools can assign cells to the partition number when creating a new nPartition.

For example, if you remove partition number 2 then the `parcreate` command or Partition Manager tool can assign cells to partition number 2 when creating a new partition, if all lower-numbered partitions (partition numbers 0 and 1) already are defined.

## Local and Remote nPartitions

When you log in to HP-UX running on an nPartition, or when you access a partition's BCH interface or console, the partition you are accessing is considered to be the **local partition**. All other partitions in the complex are considered to be **remote partitions**.

You can use the `parstatus -w` command to list the partition number for the local partition.

```
# parstatus -w
The local partition number is 1.
#
```

Your access to an nPartition—whether local or remote—determines your ability to configure and manage the nPartition. Some capabilities require *local* partition access while other capabilities only require that you log in to *any* of the nPartitions in the server complex, including remote partitions.

The following list describes many of the administration requirements for using HP-UX tools on a local or remote nPartition.

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- Listing Information—You can use the `parstatus` command or the Partition Manager utility from *any* nPartition to list partition and complex information.
- Adding (Assigning) a Cell to an nPartition—You can use `parmodify` or Partition Manager from *any* nPartition to assign a cell to any nPartition in the server complex.
- Removing (Unassigning) a Cell from an nPartition—You can unassign an *inactive cell* from its nPartition by using `parmodify` or Partition Manager on any nPartition. However, to unassign an *active cell* you must use these tools from the *local* nPartition (the partition to which the cell is assigned).
- Powering On or Off a Cell—To power on or off a cell that is *unassigned*, you can use `frupower` or Partition Manager on any partition. To power on or off an *assigned cell*, the cell must be *inactive* and you must use `frupower` or Partition Manager from the *local* nPartition (the partition to which the cell is assigned).
- Rebooting or Shutting Down HP-UX—To reboot or shut down HP-UX you must issue the `/usr/sbin/shutdown` command and appropriate options (such as `-r`, `-R`, `-h`, `-R -H`, or others) from the *local* nPartition.
- Turning Attention Indicators (LEDs) On or Off—You can use the `fruled` command or Partition Manager to control the attention indicators for all hardware in the server complex from *any* nPartition.

For details refer to the complete procedures for these administration tasks.

## Active and Inactive nPartitions

Each nPartition's boot state either is *active* or *inactive*.

An nPartition that is **active** has at least one cell that is active (not in a boot-is-blocked state). When an nPartition is active, the partition's available cells complete partition rendezvous and then the Boot Console Handler (BCH) interface is loaded and is displayed on the partition's console. HP-UX is loaded and run from BCH on an active partition.

An **inactive partition** is considered to be in a **ready for reconfig** state, because all cells assigned to the partition either remain at a boot-is-blocked state or are powered off.

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Use the `parstatus -P` HP-UX command to list all partitions and their boot states (active or inactive).

```
# parstatus -P
[Partition]
Par                 # of  # of I/O
Num Status          Cells Chassis  Core cell  Partition Name (first 30 chars)
=== ============= ===== ======== ========== ==============================
 0  inactive          2      1     ?          feshd5a
 1  active            2      1     cab1,cell2 feshd5b
#
```

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To make an inactive partition *active*, use the service processor (GSP or MP) Command menu's `BO` command. The `BO` command clears the boot-is-blocked flag for all cells assigned to the partition, thus allowing the cells to rendezvous and enabling the partition to run the BCH interface. (If all of an nPartition's cells are powered off, you must power on its cells to enable the partition to become active.)

To make a partition *inactive*, you can issue commands from HP-UX, the BCH interface, or the service processor (GSP or MP) Command menu.

- When HP-UX is running on an nPartition, you can make the partition inactive by issuing the `shutdown -R -H` command to shut down HP-UX, reboot all cells, and hold all cells at a boot-is-blocked state.
- When the BCH interface is available for an nPartition, you can make the partition inactive by issuing the BCH interface's `RECONFIGRESET` command. This reboots all cells assigned to the partition and holds all cells at a boot-is-blocked state.
- If an nPartition is active but is not responsive (that is, if you can neither log in as root to issue the `shutdown -R -H` command nor access the partition's BCH interface from its console), then use the service processor Command menu's `RR` command to make the partition inactive. This reboots all cells assigned to the partition and holds all cells at a boot-is-blocked state.

**CAUTION**

Issuing the service processor Command menu's `RR` command immediately halts all processing and I/O activity on the specified nPartition. Be certain to *correctly specify* which partition is to be reset to a ready for reconfig state.

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All three methods above reboot an nPartition and hold all of its cells at boot-is-blocked; as a result the rebooted partition is placed in a ready for reconfig (inactive) state.

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# Tools for Managing Partitions

You can use several different software tools to create, modify, and monitor a server's nPartitions and related server complex hardware.

These tools have capabilities that overlap in some cases, but each tool also has unique features and access requirements.

The tools for managing nPartitions are:

- Service Processor (GSP or MP) menus
- Virtual Front Panel (VFP) interfaces
- Boot Console Handler (BCH) interfaces
- HP-UX nPartition Configuration Commands
- Partition Manager (`/opt/parmgr/bin/parmgr`)
- System Administration Manager (SAM, `/usr/sbin/sam`)

**NOTE**

The service processor in HP servers is sometimes called the Management Processor (MP) and sometimes the Guardian Service Processor (GSP).

Regardless of the name, the service processor in these servers provides approximately the same features and performs essentially the same role.

Throughout this document the term "service processor" refers to both the MP and GSP service processors.

Table 2-1 lists the partition management tools and describes each tool's features and capabilities.

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Use Table 2-1 to select the most appropriate partition management tool based on the tasks you need to perform and the ways in which you can access the system.

**Table 2-1 HP nPartition Management Tools**

| Partition Tool | Features and Restrictions |
|---|---|
| Service Processor (GSP or MP) menus | The service processor menus provide a complex-wide service interface that allows access to complex hardware and nPartitions defined within the complex.<br>• Availability—Using service processor menus requires logging in to the service processor. Your service processor login account determines your level of access to the complex hardware and nPartitions.<br>• Features—Service processor commands, access to partition consoles, Virtual Front Panels (VFPs) for live partition status details, ability to power cycle hardware, ability to reset and TOC partitions, ability to view live chassis codes, and access to console and chassis code log files.<br>• Tasks Supported—Monitoring and listing status for all nPartitions and hardware within a server complex. Viewing chassis codes. Partition console access. Partition reset and complex hardware power control. |
| Virtual Front Panel (VFP) interfaces | The VFP interface provides a real-time display of nPartition and cell *boot states* and *activities*.<br>• Availability—Viewing the VFP interface for a partition (or entire system) requires logging in to the service processor. Your service processor user account determines which partition VFPs you can access.<br>• Features—Real-time text summaries of partition and cell boot states and activities.<br>• Tasks Supported—Monitoring nPartition boot progress and associated cell status. |

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**Table 2-1 HP nPartition Management Tools**

| Partition Tool | Features and Restrictions |
|---|---|
| Boot Console Handler (BCH) interface | The BCH interface is the method for interacting with a partition before it has booted HP-UX. Each partition's BCH interface provides menus for configuring partition settings and booting HP-UX.<br>• Availability—Using a partition's BCH interface requires accessing the partition's console through the service processor Console menu.<br>• Features—Allows you to select which device and which HP-UX kernel is booted, to configure the *boot actions* for devices, and to software-deallocate CPUs, memory, and cells.<br>• Tasks Supported—Configuring and managing the HP-UX boot process, getting partition-specific information, resetting the local partition, configuring various partition settings. |
| HP-UX nPartition Configuration Commands | The HP-UX nPartition configuration commands allow you to configure, modify, and monitor partitions and hardware within a server complex.<br>The commands include `parcreate`, `parmodify`, `parstatus`, `parremove`, `parunlock`, `fruled`, and `frupower`.<br>• Availability—Using the HP-UX nPartition configuration commands requires logging in to HP-UX running on a partition. All users can issue the `parstatus` and `fruled` commands, but all other commands require `root` user permissions.<br>• Features—These commands allow you to manage partitions and hardware when HP-UX is in single– or multi-user mode and when you are logged in with text-only terminal access.<br>• Tasks Supported—Configuring, modifying, and getting information about nPartitions and hardware within a server complex. |

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**Table 2-1 HP nPartition Management Tools**

| Partition Tool | Features and Restrictions |
|---|---|
| Partition Manager (`parmgr`) | Partition Manager (`/opt/parmgr/bin/parmgr`) provides a graphical interface for configuring, modifying, and managing partitions and hardware within a server complex.<br>• Availability—You can use Partition Manager when HP-UX is running in multi-user mode on the partition. You can use Partition Manager as a stand-alone X window application (`parmgr`) and can launch it from SAM. Partition Manager also can be launched from a PC Web browser.<br>• Features—Provides a graphical user interface and also supports Web console access. Performs additional error checking beyond what the HP-UX nPartition configuration commands support. Also supports I/O card online addition and replacement.<br>• Tasks Supported—Configuring, modifying, and getting information about partitions and hardware within a hard-partitionable server complex.<br>• Detailed Information—See the `parmgr` online help. |
| System Administration Manager (SAM) | When using SAM (`/usr/sbin/sam`) in graphical mode, you can launch Partition Manager from SAM.<br>See Partition Manager, above, for details. |

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# Rebooting to Implement nPartition Changes

Currently HP-UX 11i supports nPartitions on HP servers that support them, including HP rp8400 and HP Superdome servers.

Once an nPartition has booted and is active, the partition has a fixed set of active hardware resources. In order to establish a different set of active hardware resources for an nPartition you must reboot the partition, as described below.

You can add and remove cells from an active, booted nPartition, however you only can add or remove *inactive* cells without having to reboot the partition.

To remove an active cell from a partition, or to make a newly added cell or inactive cell *active*, you must perform a reboot for reconfig of the partition.

The following list describes situations where you may need to reboot an nPartition to implement changes.

- Perform a reboot for reconfig (**`shutdown -R`**) of an nPartition in the following situations.
  - — When you want to add one or more cells to a partition.

    Newly added cells initially are inactive when assigned to an nPartition. To allow the new cells to rendezvous (join the partition as active members) perform a reboot for reconfig.
  - — When you remove one or more cells from a partition.

    Removing an active cell requires a partition reboot for reconfig, but removing an *inactive* cell *does not* require a partition reboot for reconfig. Inactive cells are removed immediately.
  - — When you change a cell's use-on-next-boot value from "n" (no, do not use) to "y" (yes, use the cell).

    A reboot for reconfig permits the cell to rendezvous into the partition and become active; see below.
  - — When you want to allow a currently inactive cell to become active.

    A reboot for reconfig reboots all cells, allowing them an opportunity to join (rendezvous) the partition as active members.

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- Reset an nPartition to a ready for reconfig state (**`shutdown -R -H`**) to make the partition inactive.

  All cells in a partition remain inactive when the partition is in a ready for reconfig state; the cells do not perform a partition rendezvous.

- Perform a standard reboot (**`shutdown -r`**) of an nPartition in most other situations where you do not need to add or remove cells from the partition.

  A standard reboot causes only the *currently active* cells in a partition to reboot, and it does not allow any pending complex configuration changes to complete (the changes remain pending, still requiring a reboot for reconfig for them to be in effect).

  Pending changes that require a reboot for reconfig (`shutdown -R`, not a `shutdown -r`) include removing an active cell from an nPartition. The cell cannot be unassigned until its partition has a reboot for reconfig performed.

  Other changes, such as adding a cell to a partition, or changing a cell's use-on-next-boot value from "n" to "y", also require performing a reboot for reconfig (`shutdown -R`, nor `-r`) to enable the inactive cell to become active.

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# nPartition Requirements and Recommendations

The hardware *requirements* shown below determine which cells are eligible to be assigned to an nPartition.

Also consider the partition *recommendations*, which can improve an nPartition's performance and availability.

## nPartition Requirements

Every nPartition you configure must meet the following hardware requirements.

- All cells in an nPartition **must** have the same *processor revision level and clock speed*. That is, the IODC_HVERSION must be identical for all processors.
- The same firmware revision **must** be present on all cells within an nPartition.
- At least one cell in every partition **must** be connected to an I/O chassis that has core I/O.

  Only one core I/O is active per partition. If a partition has multiple cells that are connected to I/O chassis with core I/O, only the core I/O connected to the *active core cell* is active.

## nPartition Recommendations

You also should, as possible, configure nPartitions to meet the following configurations for better performance and availability.

- Each nPartition's size **should** be a power of two: 1, 2, 4, 8, or 16 cells.

  This provides the best memory interleaving and performance characteristics.

  You can configure partitions of any size, but those whose size is a power of two have best memory performance.
- The I/O chassis containing the active core I/O also **should** have an HP-UX boot disk and method of installing or recovering HP-UX (such as a CD-ROM/DVD-ROM drive, network connection to an install server, or tape drive).

  This allows the partition to boot or recover HP-UX, even if only the partition's core cell is functioning.

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- You **should** assign multiple core-capable cells to each nPartition.

  This allows the partition to boot at least to the BCH interface if a core cell fails to boot.

  (Disregard this recommendation if you are configuring multiple partitions in an HP rp8400 server or HP rp7410 server, each of which has a maximum of two core cells.)

- The memory configuration of all cells in a partition **should** be identical to achieve best performance.

  Each of a partition's cells should have:

  — the same *number of DIMMs*

  — the same *capacity (size)* and the same *locations (population)* of DIMMs

  This avoids cell interconnect (crossbar) "hot spots" by distributing memory evenly across all of the nPartition's cells.

- The memory configuration of each cell **should** include a multiple of two memory ranks per cell.

  Each memory rank is 4 DIMMs. If possible, install memory in sets of 8 DIMMs: 8 DIMMs or 16 DIMMs on HP rp8400 and HP Superdome cells. On HP Superdome cells, you also can install 24 DIMMs or 32 DIMMs per cell.

  This provides a performance improvement by doubling the cell's memory bandwidth, as compared to having one memory rank installed.

  This also can provide an availability improvement, in that if one memory rank fails the cell still has at least one functional rank of memory.

  (At this time memory rank 0 must be functional for a cell to boot.)

- Each nPartition **should** have PRI (primary), HAA (high-availability alternate), and ALT (alternate) boot paths defined and configured, and their path flags appropriately configured for your purposes.

  The PRI and HAA paths should be configured to reference disks that are connected to different cells, if possible, with HAA being a mirror of the root volume and PRI being the root volume. ALT should refer to a recovery or install device.

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Under this configuration, if the cell to which the PRI disk is connected fails or is otherwise inactive, then if the HAA disk's cell is available the nPartition still can boot HP-UX.

Even if the PRI and HAA devices connect to the same cell (such as on a multiple-partition HP rp8400 server), the HAA device can be used to boot the partition to HP-UX should the PRI device fail.

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# HP Superdome Partition Configuration Guidelines

On HP Superdome servers, the locations of the cells you assign to each nPartition and the resulting loads on server interconnections can affect system performance within the server's nPartitions.

HP offers specific guidelines for configuring nPartitions on HP Superdome servers in order to ensure good system performance.

**NOTE** The guidelines in this section apply to HP Superdome servers only.

These guidelines follow two basic configuration principles:

1. Avoid sharing interconnecting hardware (crossbars and crossbar links) among multiple nPartitions.
2. *Minimize* the number of crossbar links used by each nPartition, *but do not overload* crossbar links by creating partitions that can generate more cell communications traffic across the links than the links can support. Overloading crossbar links degrades performance.

The above principles are incorporated into the guidelines below, and are accounted for in the charts of recommended HP Superdome partitions.

Also refer to the *nPartition Requirements and Recommendations* section for other details.

## HP Superdome nPartition Guidelines

Use these guidelines to help determine which cells to assign to the nPartitions you create on HP Superdome servers.

- **Define partitions in order of size.**

  Assign cells to the partition that has the largest cell count first. Then select cells for the next largest partition, and so on, and finally choose cells for the partition with the fewest cells last.

  This provides more appropriate cell assignments for larger partitions (those with more cells). Any smaller partitions with fewer cells are more easily accommodated in the remaining, available cells.

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- **Place each partition within an empty cabinet, if possible.**

  This applies to partitions in HP Superdome 64-way servers only.

  Assign each partition cells from a cabinet whose cells have no partition assignments, if possible. Do this before assigning cells from a cabinet that already has cells assigned to a partition.

  To select cells for partitions that are larger than six cells, on HP Superdome 64-way servers, refer to the chart of recommended partitions. For such larger nPartitions, assigning some cells from both cabinet 0 and cabinet 1 provides better performance by better distributing cell communications across crossbar links.

  These guidelines can help minimize contentions for using the server's interconnecting hardware (crossbars and crossbar links).

- **Assign each partition cells from an unused "cell quad", if possible.**

  Each "cell quad" is a set of four cells that share the same cabinet backplane connections (crossbar chips). Within each HP Superdome cabinet, cell slots 0–3 comprise one cell quad, and cell slots 4–7 comprise the second cell quad.

  Because cells in a quad share the same crossbar chips they have the best cross-cell memory performance.

  Partitions with cells on different crossbar chips have higher memory latency (worse memory performance) than partitions whose cells all share the same crossbar chip.

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## Process for Selecting Cells for nPartitions

The following steps provide a basic procedure for selecting which cells to assign to the nPartitions you will create in an HP server.

**Step 1.** Determine the sizes of all partitions you will create in the server complex.

Before creating any partitions, determine how many partitions you plan to configure and establish each partition's size (the number of cells).

**Step 2.** Select the largest undefined partition.

If you will configure multiple partitions in the complex, assign cells to the largest partition first and then configure next largest, and so on, and configure the smallest partition last.

**Step 3.** Choose which cells you will assign to the nPartition by using the partition configuration chart for the server model on which you are configuring the partitions.

These charts list which cell slots HP supports for assigning to partitions, based on the partition size and server model.

For partition sizes for which HP recommends multiple configurations, select the first available set of cells. For example, for a two-cell partition select configuration 2A, if possible, before selecting 2B or 2C.

**Step 4.** Confirm that the cells you have selected are eligible to be assigned to the partition.

For the cells to be eligible, they must meet these requirements:

- The cells **must** not be assigned to another partition.
- The cells **must** meet the partition hardware requirements (the required processor, firmware, and memory configurations).
- The cells **should** be present (installed) in the server and powered on. You can assign cells that are not present or on when using `parcreate` or `parmodify`. However, you should install and power on cells *before* assigning them to nPartitions in order to allow commands to automatically check the cells' compatibility with any other cells in the partition. Also note that assigning a cell that is not present or on

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will cause the partition to wait 10 minutes for the cell during the partition boot process, if the cell has a “y” use-on-next-boot setting.

If any of the cells does not adhere to these requirements, go back to *Step 3* and select a different set of cells for the partition.

**Step 5.** Assign the cells to the partition.

You can either create a new partition that includes the selected cells, or you can modify an existing partition so that it conforms to the partition configuration recommended by the configuration chart.

For specific steps for assigning cells, refer to the procedure for creating an nPartition or the procedure for adding cells to an nPartition.

**Step 6.** If you still have additional nPartitions for which to select and assign cells, continue with *Step 2*.

Select the largest remaining undefined nPartition, and go back to *Step 2* to choose and assign cells for it.

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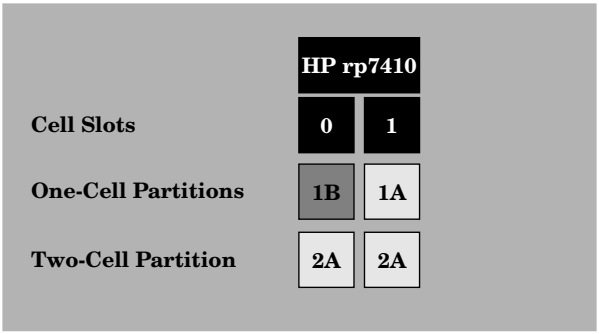
# Chart of Supported HP rp7410 nPartition Configurations

The chart in Figure 2-2 lists the nPartition configurations that HP supports for HP rp7410 servers.

**Figure 2-1 HP rp7410 Supported nPartition Configurations**



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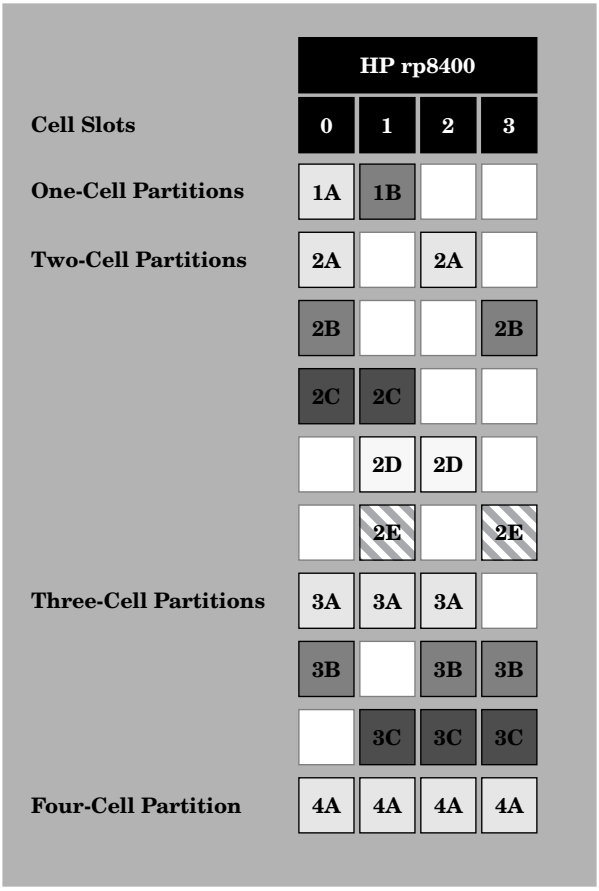
# Chart of Supported HP rp8400 nPartition Configurations

The chart in Figure 2-2 lists the nPartition configurations that HP supports for HP rp8400 servers.

**Figure 2-2 HP rp8400 Supported nPartition Configurations**




*On HP rp8400 servers, each nPartition must include either cell 0 or cell 1 because these two cells are the server's only core-capable cells.*

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# Charts of Supported HP Superdome nPartition Configurations

The chart in Figure 2-3 lists the nPartition cell configurations that HP supports for Superdome 16-way and Superdome 32-way servers.

Figure 2-4 lists the nPartition cell configurations that HP supports for Superdome 64-way servers.

Example partition configurations that use these charts to determine which cells to assign to nPartitions appear in *Example Partition Configurations for an HP Superdome Server Complex* on page 62.

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**Figure 2-3** **Superdome 16-way and Superdome 32-way Supported nPartition Configurations**

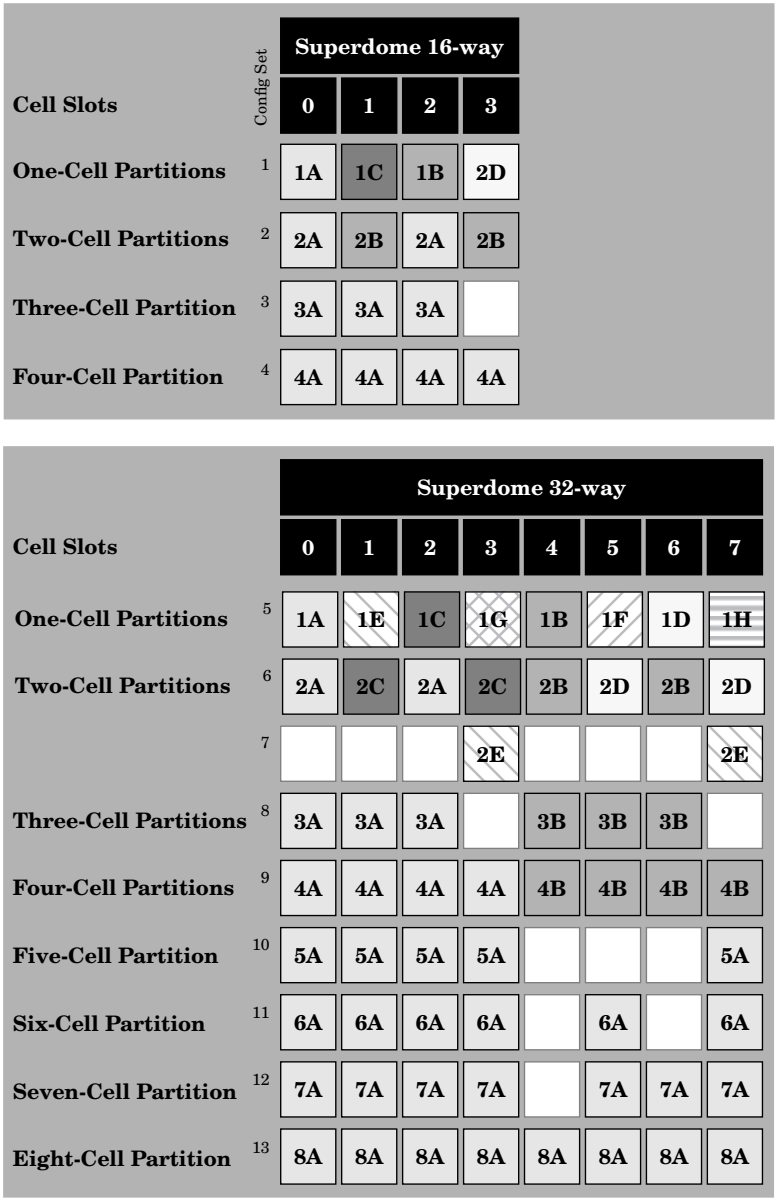

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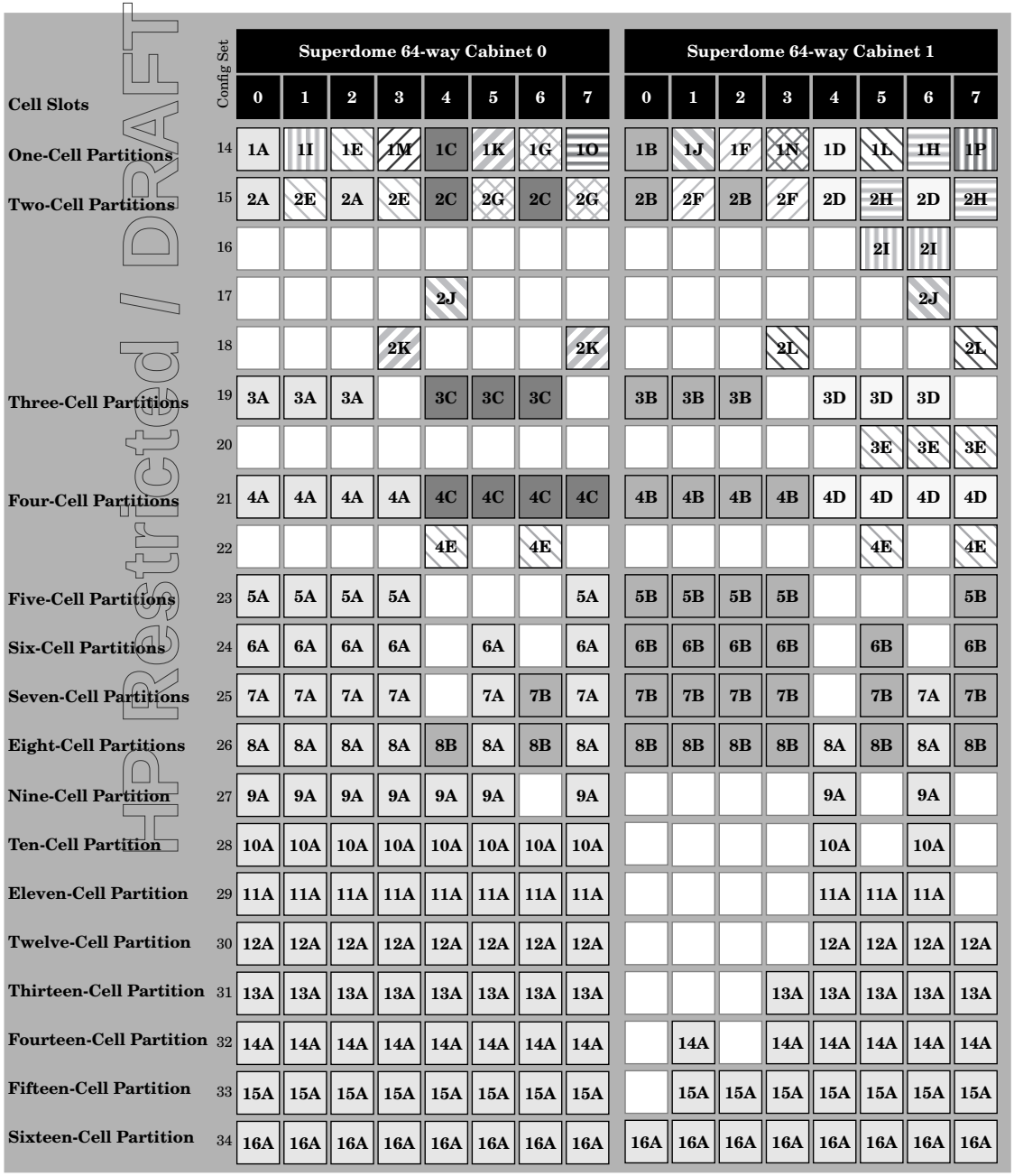
**Figure 2-4 Superdome 64-way Supported nPartition Configurations**


Config Set
Superdome 64-way Cabinet 0
Superdome 64-way Cabinet 1
Cell Slots
0 1 2 3 4 5 6 7
0 1 2 3 4 5 6 7
One-Cell Partitions
Two-Cell Partitions
Three-Cell Partitions
Four-Cell Partitions
Five-Cell Partitions
Six-Cell Partitions
Seven-Cell Partitions
Eight-Cell Partitions
Nine-Cell Partition
Ten-Cell Partition
Eleven-Cell Partition
Twelve-Cell Partition
Thirteen-Cell Partition
Fourteen-Cell Partition
Fifteen-Cell Partition
Sixteen-Cell Partition
14 1A 1I 1E 1M 1C 1K 1G 1O 1B 1J 1F 1N 1D 1L 1H 1P
15 2A 2E 2A 2E 2C 2G 2C 2G 2B 2F 2B 2F 2D 2H 2D 2H
16 2I 2I
17 2J 2J
18 2K 2K 2L 2L
19 3A 3A 3A 3C 3C 3C 3B 3B 3B 3D 3D 3D
20 3E 3E 3E
21 4A 4A 4A 4A 4C 4C 4C 4C 4B 4B 4B 4B 4D 4D 4D 4D
22 4E 4E 4E 4E
23 5A 5A 5A 5A 5A 5B 5B 5B 5B 5B
24 6A 6A 6A 6A 6A 6A 6B 6B 6B 6B 6B 6B
25 7A 7A 7A 7A 7A 7B 7A 7B 7B 7B 7B 7A 7B
26 8A 8A 8A 8A 8B 8A 8B 8A 8B 8B 8B 8B 8A 8B 8A 8B
27 9A 9A 9A 9A 9A 9A 9A 9A 9A 9A
28 10A 10A 10A 10A 10A 10A 10A 10A 10A 10A
29 11A 11A 11A 11A 11A 11A 11A 11A 11A 11A 11A
30 12A 12A 12A 12A 12A 12A 12A 12A 12A 12A 12A 12A
31 13A 13A 13A 13A 13A 13A 13A 13A 13A 13A 13A 13A 13A
32 14A 14A 14A 14A 14A 14A 14A 14A 14A 14A 14A 14A 14A 14A
33 15A 15A 15A 15A 15A 15A 15A 15A 15A 15A 15A 15A 15A 15A
34 16A 16A 16A 16A 16A 16A 16A 16A 16A 16A 16A 16A 16A 16A 16A 16A

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## Example Partition Configurations for an HP Superdome Server Complex

The following example cell assignments demonstrate the procedure for selecting cells for two sample server complex configurations.

For reference in the following examples, Figure 2-3 on page 60 and Figure 2-4 on page 61 list a unique number for each partition *configuration set*. (For example, config set 4 shows the four two-cell partition configurations that HP recommends for Superdome 16-way servers.)

- **Example 1**

  Superdome 32-way—Six-Cell Partition and Two-Cell Partition

  A Superdome 32-way server with a six-cell and two-cell partition would be configured with partitions 6A and 2B, as shown in Figure 2-3.

  In Figure 2-3, configuration sets 4–10 are eligible to be assigned on Superdome 32-way servers. The assignments are:

  1. 6A (config set 11), the recommended six-cell partition.
  2. 2B (config set 6), because cells 0 and 2 (2A) are assigned to 6A.
  3. Partitions 6A and 2B use all cells in the complex.

- **Example 2**

  Superdome 64-way—Seven-Cell Partition and Two Four-Cell Partitions

  A Superdome 64-way server with a seven-cell partition and two four-cell partitions would be configured with partitions 7A, 4B, and 4E, as shown in Figure 2-4.

  In Figure 2-4, configuration sets 11–29 are eligible to be assigned on Superdome 64-way servers.

  1. 7A (config set 25), the first recommended seven-cell partition.
  2. 4B (config set 21), because cells in 4A are used by 7A.
  3. 4E (config set 22), because some or all cells in 4A–D are assigned.
  4. Partitions 7A, 4B, and 4E use all cells except one (cabinet 1, cell 4).

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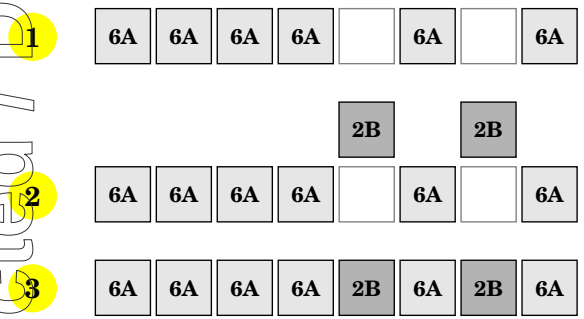
The following example illustrations show how the two example complex partition configurations would be selected, using Figure 2-3 and Figure 2-4 to determine which recommended partitions to use.

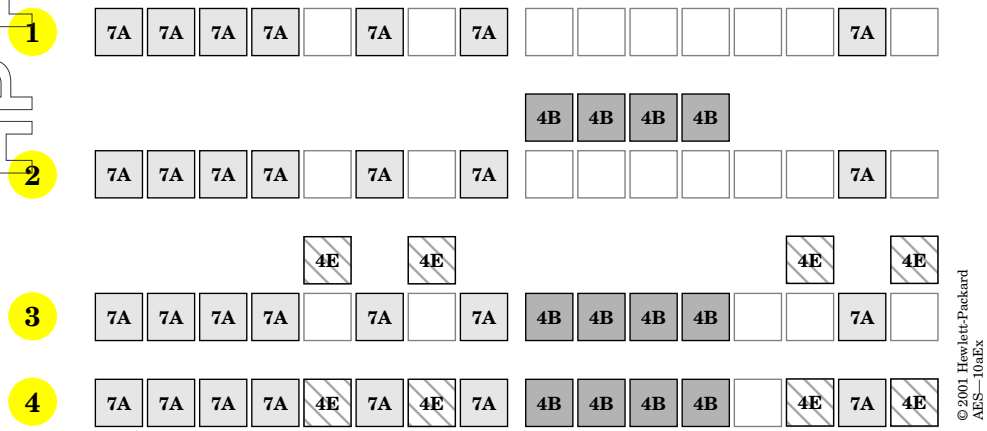
**Example 1**

Superdome 32-way complex partition configuration.
One six-cell partition and one two-cell partition.




**Example 2**

Superdome 64-way complex partition configuration.
One seven-cell partition and two four-cell partitions.

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# Server Complex Profiles

Each HP nPartition server's **Complex Profile** includes the data that determine how the server's hardware is assigned to and is used by nPartitions.

When you configure partitions and modify partition settings, the commands and utilities you use lock and unlock the server's Complex Profile when revising it, as discussed in *Locking and Unlocking Complex Profiles* on page 65.

The Complex Profile consists of two parts: *Stable Complex Configuration Data* (complex-wide settings) and *Partition Configuration Data* (individual partition settings).

You can modify partition configurations (and thus revise the Complex Profile) by using the server's service processor Command menu, partition Boot Console Handler (BCH) interfaces, or HP-UX partition commands and Partition Manager.

Each Complex Profile contains the following information for the server complex.

- **Stable Complex Configuration Data**

  This portion of the Complex Profile stores complex-wide information, including the following details:

  — The name of the complex.

  — Which cells are assigned to which partitions, and which cells are unassigned (those on the free cell list, which are available to be assigned to any partition).

  — The model number, model string, product numbers, and the serial number for the complex.

  The server complex's service processor stores the master copy of the Stable Complex Configuration Data. Each cell also stores a copy if this data.

- **Partition Configuration Data**

  This portion of the Complex Profile stores partition-specific information.

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The Partition Configuration Data includes the following details for each nPartition in the server complex:

— The partition's name, number, and IP address.

— The PRI, HAA, and ALT boot paths and boot actions (path flags).

— The use-on-next-boot setting for each cell. This determines whether the cell is allowed to become active and join (rendezvous) the rest of the cells in the partition.

— The core cell choices: a list of any cells that are preferred to be selected as the nPartition's active core cell.

Each partition has its own Partition Configuration Data, a copy of which is stored on each cell in the partition. The server's service processor also stores copies of this data for all nPartitions.

The server's service processor manages all Complex Profile data and keeps all copies of the data coherent.

## Locking and Unlocking Complex Profiles

The commands and utilities that you use to configure and modify nPartitions automatically lock and unlock portions of the Complex Profile as needed when updating the server's Complex Profile data.

Under normal circumstances you do not need to manually lock or unlock the Complex Profile. The commands, utilities, and related procedures handle all locking and unlocking.

In some situations you must perform a reboot for reconfig (`shutdown -R`) of a modified partition in order to complete a partition reconfiguration and unlock the changed portion of the Complex Profile. (For example, when removing an active cell from an nPartition you must perform a reboot for reconfig.)

HP-UX provides the `parunlock` command to force-unlock parts of a server's Complex Profile in situations where the normal procedures and utilities have failed.

Refer to the next section for details and recommendations about coordinating changes to nPartitions and related Complex Profile locking information.

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# Coordinating Changes to nPartitions

When you modify nPartitions you should perform your changes so that they occur at a time when they will not conflict with other nPartition changes in the same server complex.

The HP-UX partition configuration commands and the Partition Manager utility coordinate their actions by using *locks* to restrict access to portions of the server's *Complex Profile* data while they modify that data.

Commands and utilities can lock Stable Complex Configuration Data and Partition Configuration Data to ensure that only the command holding the lock can modify that portion of the Complex Profile.

In most cases the partition commands and utilities will not have locking conflicts because they can complete changes quickly (within about a second), usually before any other commands attempt to modify the same portion of the server's Complex Profile data.

However, some partition changes involve locking parts of the Complex Profile for a longer time.

- The Partition Manager utility locks all parts of the server's Complex Profile that it may potentially modify, and it keeps them locked for as long as the associated menu items are being used.

  For example, the **Partition —> Create Partition** menu item and the **Complex —> Set Complex Name** menu item lock the Stable Complex Configuration Data portion of the server's Complex Profile. You cannot use other tools to perform any tasks that modify the Stable Complex Configuration Data (such as adding or removing cells) until the task that acquired the lock completes or is canceled.

  Likewise, the **Partition —> Modify Partition** menu item locks both the Stable Complex Configuration Data as well as the selected partition's Partition Configuration Data. As a result, no other tool (including another instance of Partition Manager) can add or remove cells or modify the selected partition until this task has completed or been canceled.

  Some tasks performed through Partition Manager also require performing a reboot for reconfig to release locks (for example, removing an active cell from a partition).

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- When *removing an active cell* from a partition you must perform a reboot for reconfig (`shutdown -R`) of the modified partition to release the Complex Profile lock, regardless of whether you use `parmodify` or Partition Manager.

  You must perform the reboot for reconfig before you can add or remove other cells from nPartitions in the server complex. (The lock on the Stable Complex Configuration Data is not released in this case until the reboot for reconfig has occurred.)

- When you specify the `-B` option when using the `parmodify` command to *add or remove cells from an active partition*, the Stable Complex Configuration Data remains locked until the modified partition has performed a reboot for reconfig. In this situation no further changes to cell assignments can occur until after the reboot for reconfig.

Although you can use the `parunlock` command to force-unlock any parts of a server's Complex Profile, you *should not use* this command unless the program that established the lock has abnormally terminated. Instead, if possible, you should allow the Complex Profile to be unlocked as part of the normal procedures described above. See the *parunlock* (1M) manpage for details.

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# Using HP-UX nPartition Configuration Commands

HP-UX 11i provides you with several HP-UX commands for configuring and managing nPartitions and related server hardware.

The nPartition commands include: `parcreate`, `parmodify`, `parremove`, `parstatus`, `parunlock`, `fruled`, and `frupower`. Table 2-2 on page 69 describes each of these commands.

Using these commands you can create, modify, monitor, and remove nPartitions; get detailed server hardware information; and manipulate attention indicators (LEDs) and power.

When using these commands, you can specify cells and I/O chassis with the notations shown in *Specifying Cells and I/O Chassis to Commands* on page 70.

**NOTE**

The HP-UX nPartition configuration commands are supported only on HP servers that support nPartitions.

These commands are supported by HP-UX kernels built with nPartition support enabled (the `hd_fabric` driver), and they use the libfab.1 library.

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Table 2-2 describes the nPartition configuration commands and lists sections where you can find each command's syntax and details.

**Table 2-2 HP-UX nPartition Configuration Commands**

| Command | Description |
|---|---|
| `parcreate` | Create a new partition; `root` permission is required.<br>See *parcreate Command* on page 76. |
| `parmodify` | Modify an existing partition; `root` permission is required.<br>See *parmodify Command* on page 77. |
| `parremove` | Remove an existing partition; `root` permission is required.<br>See *parremove Command* on page 79. |
| `parstatus` | Display partition information and hardware details for a server complex.<br>See *parstatus Command* on page 80. |
| `parunlock` | Unlock Complex Profile data (use this command with caution); `root` permission is required.<br>See *parunlock Command* on page 82. |
| `fruled` | Blink the attention indicators (LEDs) or turn them off. This command can control these indicators for cells, I/O chassis, and cabinet numbers.<br>See the *fruled* (1) manpage for details. |
| `frupower` | Display status or turn power on or off for cells and I/O chassis; `root` permission is required.<br>See the *frupower* (1M) manpage for details. |

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## Specifying Cells and I/O Chassis to Commands

Use the cell and I/O chassis notation described in this section when you manage, configure, and inquire about cells and I/O chassis using the HP-UX nPartition configuration commands.

Details are in the *Cell Format* and *I/O Format* sections that follow.

### Cell Format

Use either of the following two formats to specify cells when using the HP-UX nPartition configuration commands: *Global Cell Number Format* or *Cell Hardware Location Format*.

- **Global Cell Number Format**

  This cell ID format is identical to the cells' HP-UX hardware path, as reported by `ioscan`.

  In global format, each cell is given a single unique number that indicates the cell's relative location in the entire server complex.

**Table 2-3 Cell IDs in Global Cell Number Format**

| **Cell Slot** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| **rp7410 Global Format** | 0 | 1 | — | — | — | — | — | — |
| **rp8400 Global Format** | 0 | 1 | 2 | 3 | — | — | — | — |
| **Superdome Cabinet 0 Global Format** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| **Superdome Cabinet 1 Global Format** | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

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- **Cell Hardware Location Format**

  In cell hardware location format, each cell is identified using two numbers that specify the *cabinet* and the *cell slot with the cabinet* where the cell resides: *cabinet/slot*.

**Table 2-4 Cell IDs in Hardware Location Format**

| Cell Slot | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| **rp7410 HW Loc Format** | 0/0 | 0/1 | — | — | — | — | — | — |
| **rp8400 HW Loc Format** | 0/0 | 0/1 | 0/2 | 0/3 | — | — | — | — |
| **Superdome Cabinet 0 HW Loc Format** | 0/0 | 0/1 | 0/2 | 0/3 | 0/4 | 0/5 | 0/6 | 0/7 |
| **Superdome Cabinet 1 HW Loc Format** | 1/0 | 1/1 | 1/2 | 1/3 | 1/4 | 1/5 | 1/6 | 1/7 |

Both of these cell ID formats specify each cell's precise physical location in a server complex. For example `parstatus -c9` and `parstatus -c1/1` refer to the same cell.

```
# parstatus -c9
[Cell]
                        CPU     Memory                                  Use
                        OK/     (GB)                            Core    On
Hardware   Actual       Deconf/ OK/                             Cell    Next Par
Location   Usage        Max     Deconf    Connected To          Capable Boot Num
========== ============ ======= ========= ==================== ======= ==== ===
cab1,cell1 active base  4/0/4    8.2/ 0.0 -                     no      yes  1

# parstatus -c1/1
[Cell]
                        CPU     Memory                                  Use
                        OK/     (GB)                            Core    On
Hardware   Actual       Deconf/ OK/                             Cell    Next Par
Location   Usage        Max     Deconf    Connected To          Capable Boot Num
========== ============ ======= ========= ==================== ======= ==== ===
cab1,cell1 active base  4/0/4    8.2/ 0.0 -                     no      yes  1

#
```

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### I/O Format

Use the following I/O hardware location format when specifying an I/O chassis to the HP-UX nPartition configuration commands:

*cabinet*/*bay*/*chassis*

The *cabinet*, *bay*, and *chassis* fields specify the physical location of the I/O chassis. The values of these fields are as follows.

- *cabinet*

  specifies the cabinet number where the I/O chassis resides.

  On HP rp8400 and rp7410 servers, the cabinet number always is `0`.

  On HP Superdome servers, the cabinet number can be:

  — `0` — the left Compute cabinet.

  — `1` — the right Compute cabinet, if present.

  — `8` — an I/O Expansion cabinet, if present.

  — `9` — an I/O Expansion cabinet, if present.

- *bay*

  specifies the I/O bay (within a cabinet) where the I/O chassis resides.

  On HP rp8400 and HP rp7410 servers, the bay number always is `0`.

  On HP Superdome servers, the bay number can be:

  — `0` — the *front* bay of a Compute cabinet, or the *bottom* bay of an I/O Expansion cabinet.

  — `1` — the *rear* bay of a Compute cabinet, or the *middle* bay of an I/O Expansion cabinet.

  — `2` — the *top* bay in an I/O Expansion cabinet.

- *chassis*

  specifies the I/O chassis (within a bay).

  On HP rp8400 and HP rp7410 servers, the chassis number is:

  — `0` — Chassis 0, which connects to cell 0 and is the left chassis as *viewed from the cabinet rear*: the left eight PCI card slots.

  — `1` — Chassis 1, which connects to cell 1 and is the right chassis as *viewed from the cabinet rear*: the right eight PCI card slots.

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On HP Superdome servers, the chassis number is:

— 1 — Chassis 1, the left chassis in the bay, as viewed when facing the bay/chassis.

— 3 — Chassis 3, the right chassis in the bay, as viewed when facing the bay/chassis.

In HP Superdome servers all chassis are 12-slot I/O chassis, both in Compute cabinets and in I/O Expansion cabinets.

The example below shows the parstatus command listing details about two different I/O chassis (cabinet 0/bay 0/chassis 1, and cabinet 0/bay 1/chassis 3).

```
# parstatus -i0/0/1
[Chassis]
                                  Core Connected  Par
Hardware Location   Usage         IO   To         Num
=================== ============ ==== ========== ===
cab0,bay0,chassis1  absent       -    -          -

# parstatus -i0/1/3
[Chassis]
                                  Core Connected  Par
Hardware Location   Usage         IO   To         Num
=================== ============ ==== ========== ===
cab0,bay1,chassis3  active       yes  cab0,cell0 0

#
```

Use the parstatus -I command to list all I/O chassis within a server complex, regardless of the chassis cell connections and partition assignments.

Use the rad -q command to list the *currently available* PCI I/O slots in the local partition and their status.

In the following example, both the parstatus and rad commands show details for various chassis and slots, including chassis 0/1/3.

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```
# parstatus -I
[Chassis]
                                  Core Connected  Par
Hardware Location   Usage         IO   To         Num
=================== ============ ==== ========== ===
cab0,bay0,chassis0  absent       -    -          -
cab0,bay0,chassis1  absent       -    -          -
cab0,bay0,chassis2  absent       -    -          -
cab0,bay0,chassis3  inactive     yes  cab0,cell4 -
cab0,bay1,chassis0  absent       -    -          -
cab0,bay1,chassis1  absent       -    -          -
cab0,bay1,chassis2  absent       -    -          -
cab0,bay1,chassis3  active       yes  cab0,cell0 0
cab1,bay0,chassis0  absent       -    -          -
cab1,bay0,chassis1  inactive     -    -          -
cab1,bay0,chassis2  absent       -    -          -
cab1,bay0,chassis3  absent       -    -          -
cab1,bay1,chassis0  absent       -    -          -
cab1,bay1,chassis1  absent       -    -          -
cab1,bay1,chassis2  absent       -    -          -
cab1,bay1,chassis3  active       yes  cab1,cell2 1
cab8,bay0,chassis1  inactive     -    -          -
cab8,bay0,chassis3  active       yes  cab0,cell2 0
cab8,bay1,chassis1  inactive     yes  cab1,cell0 -
cab8,bay1,chassis3  inactive     -    -          -
cab8,bay2,chassis1  absent       -    -          -
cab8,bay2,chassis3  absent       -    -          -
cab8,bay3,chassis1  absent       -    -          -
cab8,bay3,chassis3  absent       -    -          -

# rad -q
                                                                  Driver s)
Slot          Path        Bus   Speed   Power   Occupied   Suspended   Capable
0-1-3-0       0/0/0       0     33      On      Yes        No          No
0-1-3-1       0/0/1/0     8     33      On      No         N/A         N/A
0-1-3-2       0/0/2/0     16    33      On      No         N/A         N/A
0-1-3-3       0/0/3/0     24    33      On      No         N/A         N/A
0-1-3-4       0/0/4/0     32    33      On      No         N/A         N/A
0-1-3-5       0/0/6/0     48    33      On      Yes        No          Yes
0-1-3-6       0/0/14/0    112   33      On      No         N/A         N/A
0-1-3-7       0/0/12/0    96    33      On      No         N/A         N/A
0-1-3-8       0/0/11/0    88    33      On      Yes        No          Yes
0-1-3-9       0/0/10/0    80    33      On      No         N/A         N/A
0-1-3-10      0/0/9/0     72    33      On      No         N/A         N/A
0-1-3-11      0/0/8/0     64    33      On      No         N/A         N/A
8-0-3-0       2/0/0       0     33      On      Yes        No          No
8-0-3-1       2/0/1/0     8     33      On      No         N/A         N/A
8-0-3-2       2/0/2/0     16    33      On      No         N/A         N/A
8-0-3-3       2/0/3/0     24    33      On      No         N/A         N/A
8-0-3-4       2/0/4/0     32    33      On      No         N/A         N/A
8-0-3-5       2/0/6/0     48    33      On      No         N/A         N/A
8-0-3-6       2/0/14/0    112   33      On      Yes        No          Yes
8-0-3-7       2/0/12/0    96    33      On      No         N/A         N/A
8-0-3-8       2/0/11/0    88    33      On      No         N/A         N/A
8-0-3-9       2/0/10/0    80    33      On      No         N/A         N/A
8-0-3-10      2/0/9/0     72    33      On      No         N/A         N/A
8-0-3-11      2/0/8/0     64    33      On      No         N/A         N/A
#
```

Cabinet 0/Bay 1/Chassis 3 (0/1/3)

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## nPartition Commands—Details and Syntax

This section has details and command-line syntax for the following HP-UX nPartition configuration commands:


- *parcreate Command* on page 76
- *parmodify Command* on page 77
- *parremove Command* on page 79
- *parstatus Command* on page 80
- *parunlock Command* on page 82


**NOTE**

The sections that follow provide useful reference information for using the HP-UX nPartition commands.

For the most current information for these commands see their online manpages: *parcreate* (1M), *parmodify* (1M), *parremove* (1M), *parstatus* (1), and *parunlock* (1M).

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## `parcreate` Command

The `/usr/sbin/parcreate` command creates a new nPartition.

This command assigns the specified cells (and any attached I/O chassis) to an nPartition after removing the cells from the free cell list. This command assigns a number to the new partition and returns the partition number of the newly created partition.

Root permission is required to use `parcreate`.

See the *parcreate* (1M) manpage for complete details.

**Synopsis**

`parcreate [-P` *PartitionName*`] [-I` *IPaddress*`]`
`-c` *cell*`:[`*cell_type*`]:[`*use_on_next_boot*`]:[`*failure_usage*`] [-c...]`
`[-b` *path*`] [-t` *path*`] [-s` *path*`] [-r` *cell*`] [-r...] [-B] [-k` *s_lock*`]`

**Options**

`-P` *PartitionName* Specifies the name of the new partition.

`-I` *IPaddress* Specifies the IP address that should be used by management tools (like SAM) to address this partition.

`-c` *cell*`:[`*cell_type*`]:[`*use_on_next_boot*`]:[`*failure_usage*`]`
Specifies the cell(s) to be assigned to the partition.

- The only valid *cell_type* value is:

  `base` Base cell (the default).

- The valid *use_on_next_boot* values for cells are:

  `y` Participate in reboot. (The default.)

  `n` Do not participate in reboot.

- The only valid *failure_usage* value is:

  `ri` Reactivate with interleave (the default).

`-b` *path* Specifies the primary (PRI) boot path.

`-t` *path* Specifies the alternate (ALT) boot path.

`-s` *path* Specifies the secondary (HAA) boot path.

`-r` *cell* Specifies the core cell choices. One to four cells can be specified.

`-B` Specifies to boot the partition. The default is not to boot the partition and leave it in a ready for reconfig state.

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## `parmodify` Command

You can use the `/usr/sbin/parmodify` command to modify the following attributes of an existing partition:

- Partition name
- Cell assignments (add cells or remove cells)
- Attributes of existing cells (such as the use-on-next-boot value)
- Core cell and core alternate cells
- Boot paths (the primary, alternate, and HA alternate paths)

Root permission is required to use this command.

See the *parmodify* (1M) manpage for complete details.

### Synopsis

`parmodify -p` *PartitionNumber*
`-a` *cell*`:[`*cell_type*`]:[`*use_on_next_boot*`]:[`*failure_usage*`] [-a...] |`
`-m` *cell*`:[`*cell_type*`]:[`*use_on_next_boot*`]:[`*failure_usage*`] [-m...] |`
`-I` *IPaddress* `|` `-r` *cell* `[-r...] |` `-d` *cell* `[-d...] |` `-b` *path* `|`
`-t` *path* `|` `-s` *path* `|` `-P` *PartitionName* `|` `-B |` `-k` *s_lock*`:`*p_lock*

The `-p` option is required.

### Options

The `parmodify` command supports the following command-line options.

`-p` *PartitionNumber*
Specifies the partition to be modified. *PartitionNumber* specifies the unique number (integer) assigned to the partition. The `-p` option is required.

Note that you must also to specify any one or more of the following options.

`-a` *cell*`:[`*cell_type*`]:[`*use_on_next_boot*`]:[`*failure_usage*`]`
Specifies the cell(s) to be added to the partition.

- The valid *cell_type* value is:

  | | |
  |---|---|
  | `base` | Base cell. (The default.) |

- The valid *use_on_next_boot* values for cells are:

  | | |
  |---|---|
  | `y` | Participate in reboot. (The default.) |
  | `n` | Do not participate in reboot. |

- The only valid *failure_usage* value is:

  | | |
  |---|---|
  | `ri` | Reactivate with interleave (the default). |

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`-m` *cell*`:[`*cell_type*`]:[`*use_on_next_boot*`]:[`*failure_usage*`]`
: Modify attributes of a cell already assigned the partition.

  For details on *cell_type*, *use_on_next_boot*, and *failure_usage* see the `-a` option's descriptions (above).

`-I` *IPaddress*
: Specifies the IP address that should be used by management tools (like SAM) to address this partition.

`-r` *cell*
: Specifies the core cell and core alternate cells. One to four core cell choices can be specified.

`-d` *cell*
: Remove the specified cell from the partition.

`-b` *path*
: Specifies the primary (PRI) boot path.

`-t` *path*
: Specifies the alternate (ALT) boot path.

`-s` *path*
: Specifies the secondary (HAA) boot path.

`-P` *PartitionName*
: Specifies the name of the partition.

`-B`
: Specifies whether to boot the partition. The default is not to boot.

  When you specify the `-B` option when modifying an *inactive* nPartition, the partition is booted (and becomes active) when it is modified.

  When you specify the `-B` option when modifying an *active* nPartition, you must perform a reboot for reconfig of the modified partition. You must perform this reboot for reconfig before any other cell assignments can take place in the server complex.

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### `parremove` Command

The `/usr/sbin/parremove` command removes an existing partition. This removes all cells from the partition and destroys the partition definition.

To remove the *local* nPartition (the partition from which you issue this command) you must specify the `-F` option.

To remove a *remote* nPartition, the remote nPartition must be inactive: it must be shut down to a ready for reconfig state or the `parremove` command will not be able to remove the partition.

Root permission is required to run this command.

See the *parremove* (1M) manpage for complete details.

**Synopsis**

`parremove -p` *PartitionNumber* `[-F]`

**Options**

`-p` *PartitionNumber* Specifies the partition number to be removed.

`-F` Forcibly remove the partition. If the partition is inactive, the partition is removed. If the partition is active and if it is the local partition, the partition is removed.

If the partition is active but is not the local partition, then the partition *will not* be removed.

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## `parstatus` Command

The `/usr/sbin/parstatus` command displays information about the partitions or hardware within a server complex. If you specify no arguments, `parstatus` lists information about several of the major components of the server complex.

You can specify an individual entity (cell, I/O chassis, cabinet, or partition) to restrict the output to information about that component.

All users can issue this command.

See the *parstatus* (1) manpage for complete details.

**Synopsis**

```
parstatus -s
parstatus -w
parstatus [-X]
parstatus [-A] [-M] -C|-I
parstatus [-M] -B|-P
parstatus [-M] -i IOchassis [-i...]
parstatus [-V|-M] -c cell [-c...]
parstatus [-V|-M] -b cabinet [-b...]
parstatus [-V|-M] -p PartitionNumber [-p...]
```

**Options**

| | |
|---|---|
| `-s` | Indicate (through `parstatus` exit status) whether the system is an HP server that supports nPartitions. |
| `-w` | Display the partition number for the local partition. |
| `-X` | Display the server complex's attributes. |
| `-A` | Only display the available resources in the complex. |
| `-V` | Increase the amount of information displayed. |
| `-M` | Produce output suitable for machine parsing. |
| `-C` | Show information for all the cells in the complex. |
| `-I` | Show information for all I/O chassis in the complex. |
| `-B` | Show information for all cabinets in the complex. |

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| | |
|---|---|
| `-P` | Show information for all partitions in the complex. |
| `-c` *cell* | Show information about the specified cell. |
| `-i` *IOchassis* | Show information about the specified I/O chassis. |
| `-b` *cabinet* | Show information about the specified cabinet. |
| `-p` *partition* | Show information about the specified partition. |

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### `parunlock` Command

The `/usr/sbin/parunlock` command unlocks the Stable Complex Configuration Data or Partition Configuration Data.

**Use this command with caution.**

Root permission is required to run this command.

See the *parunlock* (1M) manpage for details.

**Synopsis**

```
parunlock [-p PartitionNumber] [-s]
parunlock -A
```

**Options**

`-p` *PartitionNumber*
: Unlock the Partition Configuration Data of the specified partition.

`-s`
: Unlock the Stable Complex Configuration Data.

`-A`
: Unlock the Stable Complex Configuration Data and the Partition Configuration Data of all the partitions in the complex.

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# Using the Partition Manager Utility

The Partition Manager utility (`/opt/parmgr/bin/parmgr`) provides a graphical user interface for configuring nPartitions and managing resources within a server complex.

This section introduces these topics about Partition Manager: *Partition Manager Primary Window*, *Running Partition Manager*, *Requirements and Limits*, and *Partition Manager Online Help*.

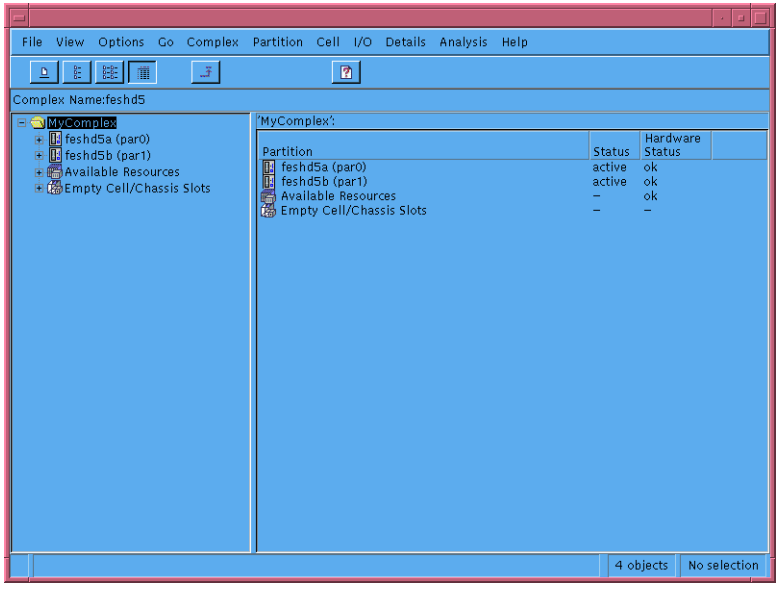
Complete information is in the online help.

## Partition Manager Primary Window

The Partition Manager primary window (shown below in Figure 2-5) is the utility's main window for selecting cells, partitions, and tasks (menu items).

When you run Partition Manager, by default the program performs an Analyze Complex Health task. If any problems are found then a window reporting those problems is displayed. The primary window is the first window displayed after any complex health analysis results.

**Figure 2-5 Partition Manager Primary Window**



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The left side of the primary window lists all partitions, available resources (installed hardware that is not assigned to a partition), and empty cell and I/O chassis slots. Selecting an item on the left side of the primary window displays its details on the primary window's right side.

## Running Partition Manager

You can access Partition Manager using the following methods.

- Run Partition Manager directly from the HP-UX command line by issuing this command: `/opt/parmgr/bin/parmgr`

  Command-line options are listed in the *parmgr* (1M) manpage.

- Run SAM (`/usr/sbin/sam`) in graphical mode and select **Partition Manager** to launch Partition Manager.

- Access Partition Manager through a PC Web browser.

  Web access requires that an Apache Web server be installed, configured, and activated on the partition where you will run Partition Manager. See the online help's **Starting and Exiting** section for Web configuration details.

When running Partition Manager directly or when launching it from SAM, you must set and export the nPartition system's DISPLAY environment variable. The DISPLAY variable specifies where (which X server) the system displays X windows. You also must use the `xhost` command on the X server to grant access for the nPartition system to display windows on the X server. See the example below and the *X* (1) and *xhost* (1M) manpages for details.

nPartition System

```
# hostname
feshd5a
# export DISPLAY=razmataz:0
# printenv DISPLAY
razmataz:0
#
```

X Server

```
$ hostname
razmataz
$ xhost + feshd5a
feshd5a being added to access control list
$
```

## Requirements and Limits

The following are requirements and limits of Partition Manager.

See the *parmgr* (1M) manpage for other requirements.

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- Partition Manager provides graphical interfaces only, and does not provide a terminal (text mode) interface.
- Using Partition Manager requires `root` permission.
- HP-UX must be running in multi-user mode to support Partition Manager.
- You can run only one instance of Partition Manager or SAM (`/usr/sbin/sam`) per user login session. To run multiple instances of Partition Manger, you must log in separately to launch each.

  Both Partition Manager and SAM use the same lock file (/var/sam/lock/lock_console) to ensure that no more than one instance of either application runs at a time per user login session.
- Partition Manager uses the same driver and library as the HP-UX nPartition commands (the hd_fabric driver and libfab.1 library).
- Partition Manager also provides PCI online card add and replace functionality similar to SAM's, and uses the libolrad.1 library for this functionality.

### Partition Manager Online Help

The Partition Manager online help gives complete details on using the Partition Manager utility.

Select the **Help —> Overview** menu item for an online overview.

You also can view Partition Manager help from a Web browser by issuing the following command:

```
/opt/netscape/netscape file:/opt/webadmin/parmgr/help/C/assistance.html
```

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# 3 Using Console and Service Processor Interfaces

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This chapter covers the service processor and nPartition console interfaces available for HP's nPartition servers.

**NOTE**

The **service processor** in HP servers is sometimes called the Management Processor (MP) and sometimes the Guardian Service Processor (GSP).

Regardless of the name, the service processor in these servers provides approximately the same features and performs essentially the same role.

Throughout this document the term "service processor" refers to both the MP and GSP service processors.

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# Service Processor (GSP or MP) Features

The **service processor** (GSP or MP) utility hardware is an independent support system for nPartition servers. It provides a way for you to connect to a server complex and perform administration or monitoring tasks for the server hardware and its nPartitions.

The main features of the service processor include the Command menu, nPartition consoles, console logs, chassis code viewers, and partition Virtual Front Panels (live displays of nPartition and cell states). For details see the *Summary of Main Service Processor Features* on page 89.

The service processor is available when its cabinet has standby power, even if the main (48-volt) cabinet power switch is turned off.

Access to the service processor is restricted by user accounts. Each user account is password protected and provides a specific level of access to the server complex and service processor commands.

Multiple users can independently interact with the service processor because each service processor login session is private. However, some output is mirrored: the Command menu and each nPartition console permit one interactive user at a time and mirror output to all users accessing those features. Likewise, the service processor mirrors live chassis codes to all users accessing the Live Chassis Logs feature.

Up to 16 users can simultaneously log in to the service processor through its network (customer LAN) interface and they can independently manage nPartitions or view the server complex hardware states.

Two additional service processor login sessions can be supported by the local and remote serial ports. These allow for serial port terminal access (through the local RS-232 port) and external modem access (through the remote RS-232 port).

In general, the service processor (GSP or MP) on nPartition servers is similar to the service processor on other HP servers, while providing enhanced features necessary for managing a multiple-nPartition server.

For example, the service processor manages the complex profile, which defines nPartition configurations as well as complex-wide settings for the server.

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The service processor also controls power, reset, and TOC capabilities, displays and records system events (chassis codes), and can display detailed information about the various internal subsystems.

### Summary of Main Service Processor Features

The primary features available through the service processor are:

- **The Service Processor Command Menu**

  The Command menu provides commands for system service, status, access configuration, and manufacturing tasks.

  To enter the Command menu, enter **CM** at the service processor Main menu. To exit the service processor Command menu, enter **MA** to return to the service processor Main menu.

  Service processor commands are restricted based on the three levels of access: Administrator, Operator, and Single Partition User. Each login account has a designated access level that allows use of a subset of the service processor commands (or all commands, for administrator-level users).

- **Partition Consoles**

  Each nPartition in a server complex has its own console.

  Enter **CO** at the service processor Main menu to access the nPartition consoles. To exit the console, type **^b** (**Control-b**).

  Each nPartition's console output is reflected to all users currently accessing the console.

  One console user can have interactive access to each nPartition's console, and all other users of the console have read-only access. To gain write access for a console, type **^e cf** (**Control-e c f**).

  Each nPartition's console provides access to:

  — Boot Console Handler (BCH) interace for the nPartition.

  The BCH interface is available if the nPartition has booted but has not yet loaded or booted the HP-UX operating system.

  — HP-UX console for the nPartition.

  The nPartition console provides console login access to HP-UX and serves as `/dev/console` for the nPartition.

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- **Console Logs**

  Enter **CL** from the service processor Main menu to access the console logs menu. To exit the console log, type **^b** (**Control-b**).

  Each nPartition has its own console log, which has a history of the nPartition console's output, including boot output, BCH activity, and any HP-UX console login activity.

  The console log provides a limited history; it is a circular log file that overwrites the oldest information with the most recent.

  All console activity is recorded in the console's log, regardless of whether any service processor users are connected to the console.

- **Chassis Logs Viewers (Live and Recorded Chassis Codes)**

  Enter **SL** to access the chassis log viewer. To exit the chassis viewer type **^b** (**Control-b**).

  Three types of chassis code log views are available: activity logs, error logs, live chassis code logs.

  The activity log and error log provide views of past chassis codes.

  The *live chassis code* view provides:

  — Real-time view of chassis codes.

  — Options for filtering the live chassis code output to show only the chassis codes related to a specific cell (**C**), a specific nPartition (**P**), or alerts (**A**, for codes of alert level 3 and higher). Type **U** to view unfiltered codes (all chassis codes).

  All logs (activity, error, and live) can be displayed in different formats, including: keyword format, text format, hex (with keywords), and raw hex format.

  When viewing chassis logs, type **V** followed by a format selector to change the display format.

- **Virtual Front Panels**

  Each nPartition's Virtual Front Panel (VFP) displays real-time status of the nPartition boot status and activity, and details about all cells assigned to the nPartition. The VFP display automatically updates as cell and nPartition status changes.

  Enter **VFP** at the Main menu to access the View Front Panel menu. To exit a Virtual Front Panel, type **^b** (**Control-b**).

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# Service Processor Accounts and Access Levels

To access the service processor interface for a server complex, you must have a user account that enables you to log in to the service processor.

Each server complex has its own set of service processor user accounts, which are defined for the server complex and may differ from accounts on other complexes.

Service processor user accounts have a specific login name, password, and access level.

The three user account access levels are:

- **Administrator**

  Provides access to all commands, and access to all nPartition consoles and Virtual Front Panels.

  Can manage user accounts (using the Command menu **SO** command) and can reconfigure various service processor settings.

- **Operator**

  Provides access to a subset of commands, and access to all nPartition consoles and Virtual Front Panels.

  Can reconfigure the service processor.

- **Single Partition User**

  Provides access to a restricted subset of commands, and access to a single nPartition's console and a single nPartition's Virtual Front Panel.

  Can only execute commands that affect the *assigned nPartition*.

  *Cannot* execute commands that could potentially affect multiple partitions or affect the service processor configuration.

Each user account can permit multiple concurrent login sessions (if it is a "multiple use" account), or restrict account access to a single login session (for "single use" accounts).

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# Accessing Service Processor Interfaces

This section describes how to log in to the service processor (GSP or MP) for an nPartition server complex.

You can connect to a server complex's service processor using the following methods:

- Connecting through the **customer LAN port** by using `telnet`, if login access through the customer LAN is enabled for the service processor.

  On HP Superdome servers, the customer LAN is labeled "Customer LAN". On HP rp8400 servers it is "GSP LAN". On HP rp7410 servers it is the only LAN port on the core I/O.

- Connecting through the **local RS-232 port** using a direct serial cable connection.

  On HP Superdome servers the local RS-232 port is labeled "Local RS-232". On HP rp8400 servers it is the "Local Console" port. On HP rp7410 servers it is the 9-pin D-shaped connector (DB9) labeled "Console".

- Connecting through the **remote RS-232 port** using external model (dial-up) access, if remote modem access is configured.

  On HP Superdome servers the remote RS-232 port is labeled "Remote RS-232". On HP rp8400 servers it is the "Remote Console" port. On HP rp7410 servers it is the DB9 connector labeled "Remote".

Normally, when the customer LAN is configured, users will connect to a server complex's service processor by using the `telnet` command on a remote system.

Use `telnet` to open a connection with the service processor, then log in by entering the account name and corresponding password. Each login account provides a specific level of access (administrator, operator, single-partition user) for using the service processor menus and commands.

Figure 3-1 shows a sample service processor login session.

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**Figure 3-1 Example: Connecting to a Service Processor**

```
> telnet hpsys-s
Trying...
Connected to hpsys-s.rsn.hp.com.
Escape character is '^]'.
Local flow control off

MP login: Accountname
MP password:


                          Welcome to the

                          S Class 16K-A

                       Management Processor

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                          Version 0.23


    MP MAIN MENU:

        CO: Consoles
       VFP: Virtual Front Panel
        CM: Command Menu
        CL: Console Logs
        SL: Show chassis Logs
        HE: Help
         X: Exit Connection

MP>
```

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## Procedure: Logging in to a Service Processor

This procedure connects to and logs in to a server complex's service processor (GSP or MP) using `telnet` to access the customer LAN.

If connecting through the local or remote RS-232 port, skip *Step 1* (instead establish a direct-cable or dial-up connection) and begin with *Step 2*.

**Step 1.** Use the HP-UX `telnet` command on a remote system to connect to the service processor for the server complex.

You can connect directly from the command line, for example:

```
telnet sdome-g
```

or run `telnet` first, and then issue the `open` command (for example, `open sdome-g`) at the `telnet>` prompt.

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All `telnet` commands and escape options are supported while you are connected to the service processor. See the *telnet*(1) manpage for details.

(On non-HP-UX platforms such as various PC environments you can instead use an alternate `telnet` program.)

**Step 2.** Log in using your service processor user account name and password.

```
GSP login: Accountname
GSP password: Password
```

**Step 3.** Use the service processor menus and commands as needed and log out when done.

To log out, select the Exit Connection menu item from the Main menu (enter **X** at the `GSP>` prompt or `MP>` prompt).

You also can terminate a login session by issuing the `telnet` escape key sequence **^]** (type: **Control-right bracket**) and entering **`close`** at the `telnet>` prompt.

**NOTE**

If possible you should log out of any consoles and menus before terminating your telnet session.

If accessing HP-UX on an nPartition, *log out of HP-UX* before exiting the console and service processor sessions. (Otherwise an open HP-UX login session will remain available to any other service processor users.)

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## Using Service Processor Menus

The service processor (GSP or MP) has a set of menus that give you access to various commands, consoles, log files, and other features.

See *Navigating through Service Processor Menus* on page 97 for details on using these menus.

The following menus are available from the service processor Main menu (which is the menu you first access when logging in):

- **Console Menu**—Provides access to consoles for the server's nPartitions.
- **Virtual Front Panel Menu**—Provides a Virtual Front Panel for each nPartition (or for the entire server complex).
- **Command Menu**—Includes service, status, system access, and manufacturing commands.
- **Console Log Viewer Menu**—Allows access to the server's console logs.
- **Chassis Log Viewer Menu**—Allows access to the server's chassis code logs.
- **Help Menu**—Provides online help on a variety of service processor topics and on all service processor Command menu commands.

These menus provide a central point for managing an nPartition server complex outside of HP-UX.

The service processor menus provide many tools and details not available elsewhere. More administration features also are available from the nPartition BCH interfaces, or from HP-UX commands and utilities running on one of the server complex's nPartitions.

**NOTE**

Some specific service processor menu options and features differ slightly on different hardware platforms and firmware revisions. However, most features are identical and behave as described here.

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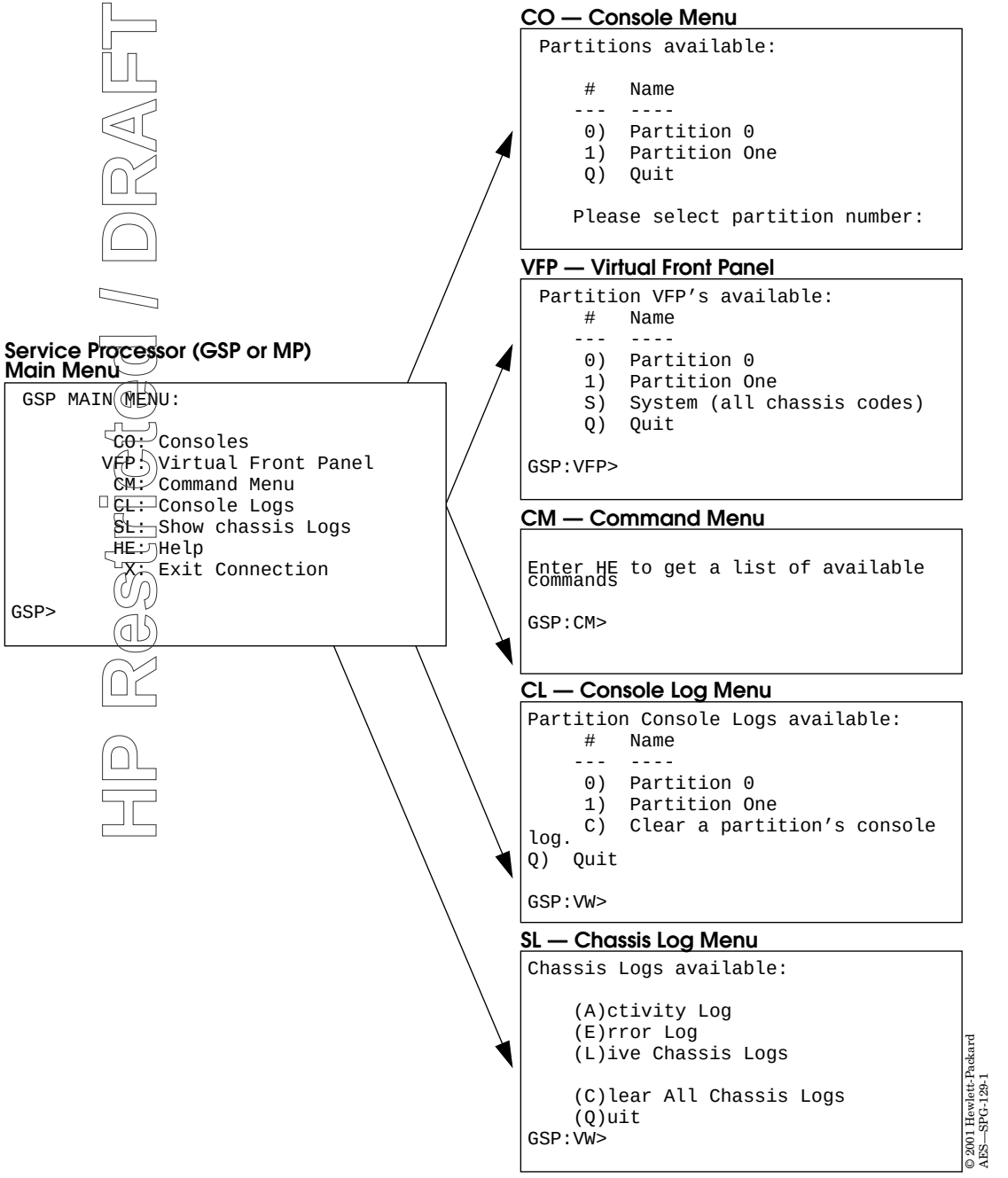
**Figure 3-2 Overview of Service Processor (GSP or MP) Menus**

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## Navigating through Service Processor Menus

Figure 3-3 on page 98 shows the commands and options for returning to the service processor Main menu and for ending a service processor login session.

The following list also includes tips for navigating through service processor menus and using various menu features:

- **`Control-b`**

  **Exit current console, console log, chassis log, or Virtual Front Panel.**

  When accessing an nPartition's console, any log files, or any Virtual Front Panel (VFP), you can exit and return to the Main menu by typing **`^b`** (**Control-b**).

- **`Q`** (or lower-case **`q`**)

  **Exit or cancel current menu prompt.**

  Enter **`Q`** (or lower-case q) as response to any menu prompt to exit the prompt and return to the previous sub-menu.

  You can do this throughout the service processor menus, including the console menus, various command menu prompts, and the log and VFP menus.

  Note that, from the Command menu prompt (`GSP:CM>` or `MP:CM>`) you must enter **`MA`** (not Q) to return to the Main menu. However, you can enter **`Q`** or **`q`** to cancel any command.

- **Control-]**

  **Escape the service processor connection and return to the telnet prompt.**

  At any time during your `telnet` connection to a service processor, you can type the **`^]`** (**Control-right bracket**) escape sequence.

  This key sequence escapes back to the `telnet` prompt. When at the `telnet>` prompt you can use the following commands, among others: **`?`** (print telnet command help information), **`close`** (close the current connection), and **`quit`** (exit telnet).

  To return to the service processor connection, type enter (or return) one or more times.

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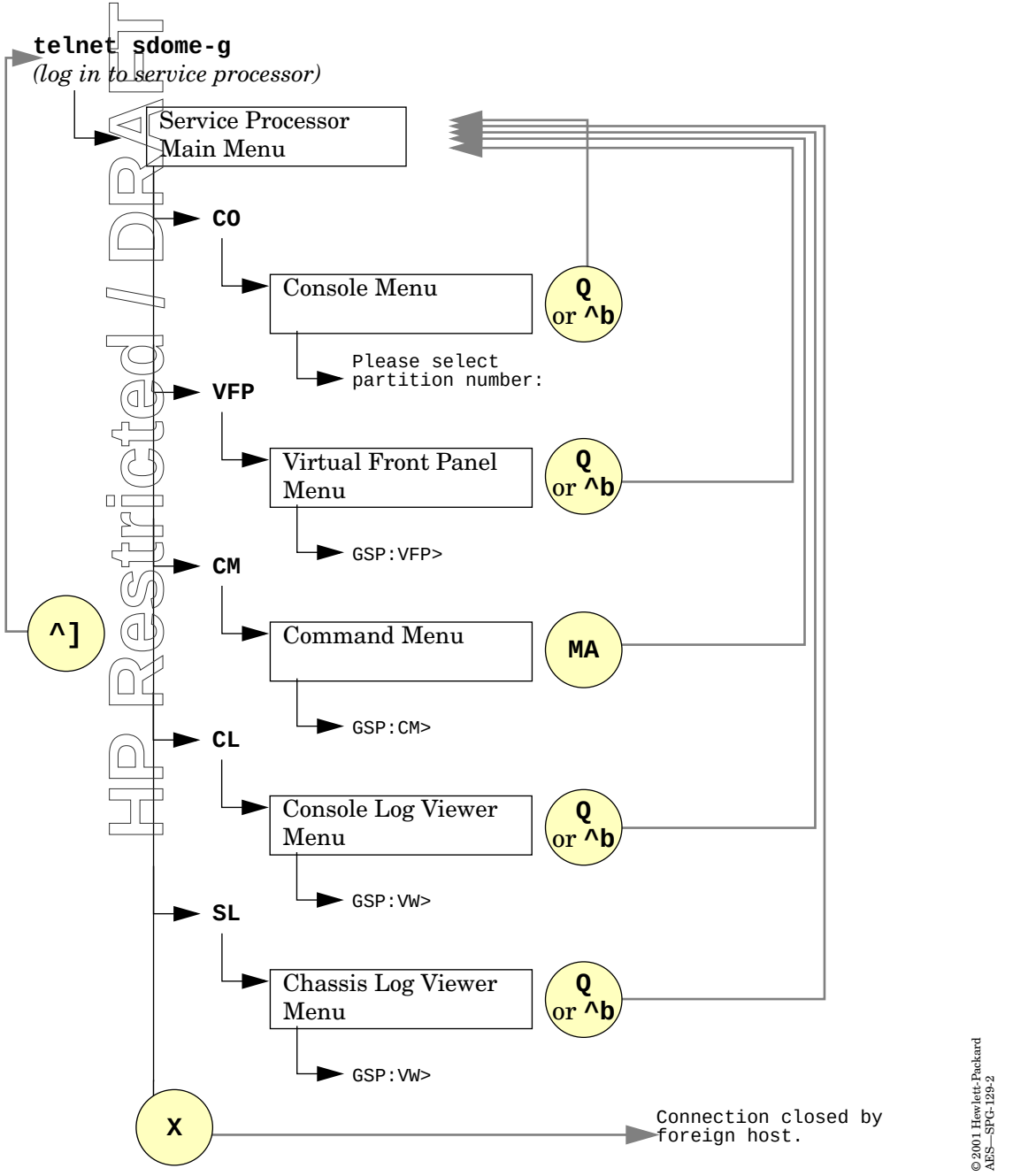
**Figure 3-3 Navigating through Service Processor (GSP or MP) Menus**

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# Using Service Processor Commands

You can issue commands at the service processor Command menu.

To access the service processor Command menu, enter **CM** at the service processor's Main menu. To exit the Command menu, enter the **MA** command to return to the Main menu.

All service processor users accessing the Command menu share access to the menu.

Only one command can be issued at a time. For each command issued, the command and its output are displayed to all users currently accessing the Command menu.

Some commands are restricted and are available only to users who have Administrator or Operator privileges. You can issue any command that is valid at your access level by entering the command at the Command menu prompt (`GSP:CM>` or `MP:CM>`).

When you list commands using the **HE** command, the commands are shown in the following categories:

- Service commands—Support boot, reset, TOC, and other common service activities.
- Status commands—Give command help and system status information.
- System and access configuration commands—Provide ways to configure system security and console and diagnostic settings.

The following sections give more details about the available commands.

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## Commonly Used Service Processor Commands

Table 3-1 summarizes commands that are commonly used by system administrators. These commands are available to all service processor users.

**Table 3-1 Commonly Used Service Processor Commands**

| Command | Description |
|---|---|
| BO | Boot an nPartition past an inactive boot-is-blocked (BIB) state to make it active. |
| CP | Display nPartition cell assignments. |
| HE | Help: list the available commands. |
| LS | Display LAN connected console status. |
| MA | Return to the service processor Main menu. |
| PD | Set the default nPartition for the current session. |
| PS | Display detailed power and hardware configuration status. |
| RS | Reset an nPartition. |
| RR | Reset an nPartition to a *ready for reconfiguration* state, which makes the nPar inactive. |
| SYSREV | Display all cabinet FPGA and firmware revisions. (HP rp8400 and HP rp7410 only.) |
| TC | Send a TOC signal to an nPartition. |
| TE | Broadcast a message to all users of the Command menu. |
| WHO | List all users connected to the service processor. |

The above commonly used commands appear in the service, status, and the system and access configuration categories.

For additional commands, by category, see the following sections.

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# Service Processor Commands: Quick Reference

The following tables list commands available from the service processor Command menu:


- *Service Commands* on page 101
- *Status Commands* on page 102
- *System and Access Configuration Commands* on page 103


**NOTE**

For a complete and current list of all service processor commands, enter the **HE** command at the service processor Command menu.

### Service Commands

The service commands available provide boot, reset, power, TOC, status, and other commands for common service activities.

**Table 3-2 Service Processor: Service Commands**

| Command | Description |
|---|---|
| BO | Boot an nPartition past an inactive boot-is-blocked (BIB) state to make it active. |
| DF | Display FRU information of an entity. |
| MA | Return to the Main menu. |
| MFG | Enter the manufacturing mode. (Administrator only.) |
| MR | Modem reset. |
| PE | Power entities on or off. (Administrator and operator only.) |
| RE | Reset entity. (Administrator and operator only.) |
| RR | Reset an nPartition to a *ready for reconfiguration* state, which makes the nPar inactive. |

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**Table 3-2 Service Processor: Service Commands**

| Command | Description |
|---|---|
| RS | Reset an nPartition. |
| SYSREV | Display all cabinet FPGA and firmware revisions. (HP rp8400 and HP rp7410 servers only.) |
| TC | Send a TOC signal to an nPartition. |
| TE | Broadcast a message to all users of the Command menu. |
| VM | Margin the voltage in a cabinet. (HP Superdome servers only.) |
| WHO | Display a list of users connected to the service processor. |

### Status Commands

The status commands provide command help and system status information, such as hardware status and nPartition configurations.

**Table 3-3 Service Processor: Status Commands**

| Command | Description |
|---|---|
| CP | Display nPartition cell assignments. |
| HE | Display the list of available commands. |
| IO | Display I/O chassis connections to cells. (HP Superdome servers only.) |
| LS | Display LAN connected console status. |
| MS | Display the status of the modem. |
| PS | Display detailed power and hardware configuration status. |

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### System and Access Configuration Commands

The system and access configuration commands provide ways to configure system security and console and diagnostic settings. These commands also enable you to modify some complex configuration settings. Some of these commands are restricted (users with an "Operator" or "Single Partition User" access level can issue a subset of these commands).

**Table 3-4 Service Processor: System and Access Configuration Commands**

| Access Level(s) | Command | Description |
|---|---|---|
| Administrator | AR | Configure the automatic system restart for an nPartition. |
| Administrator, Operator | CA | Configure asynchronous and modem parameters. |
| Administrator, Operator | CC | Initiate a complex configuration. |
| Administrator | DATE | Set the time and date. |
| Administrator | DC | Reset parameters to default configuration. |
| Administrator, Operator | DI | Disconnect remote or LAN console. |
| Administrator | DL | Disable LAN console access. |
| Administrator | EL | Enable LAN console access. |
| Administrator, Operator, Single Partition User | ER | Configure remote/modem port access options. |
| Administrator, Operator | FW | Firmware update utility. (HP rp8400 and HP rp7410 servers only.) |
| Administrator, Operator, Single Partition User | ID | Display and/or change certain Stable Complex Configuration Data fields, which describe the complex identity. |
| Administrator | IF | Display network interface information. |

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**Table 3-4 Service Processor: System and Access Configuration Commands**

| Access Level(s) | Command | Description |
|---|---|---|
| Administrator, Operator | IT | Modify command interface inactivity time-out. |
| Administrator | LC | Configure LAN connections. |
| Administrator, Operator, Single Partition User | LS | Display LAN connected console status. |
| Administrator | ND | Enable/disable network diagnostics. |
| Administrator, Operator | PD | Set the default nPartition for the current session. |
| Administrator, Operator | PWRGRD | Configure power grid settings. (HP rp8400 and HP rp7410 servers only.) |
| Administrator, Operator | RL | Rekey complex profile lock. |
| Administrator | SO | Configure security options and access control. |
| Administrator, Operator | XD | Service processor diagnostics and reset options. |

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# Configuring Service Processor Network Settings

This section describes how to list and configure the network settings for service processor (GSP or MP) hardware. These settings are used for connections to the service processor and are not used for HP-UX networking.

Details on configuring service processor networking are given in the procedure *Service Processor (GSP or MP)* on page 107.

The service processor utility hardware on HP Superdome servers has two network connections: the customer LAN and private LAN. The service processor on HP rp8400 and HP rp7410 servers do not have a private LAN but have only customer LAN connections.

Features of service processor LANs are given in the following list.

- The **customer LAN** is the connection for login access to the service processor menus, consoles, commands, and other features.

  All HP nPartition servers have a customer LAN.

  On HP Superdome servers, the customer LAN port is labeled “Customer LAN”. On HP rp8400 servers it is “GSP LAN”. On HP rp7410 servers it is the only LAN connection on each core I/O board.

- The **private LAN** is the connection to the Superdome service support processor (SSP) workstation.

  Only Superdome servers have a private LAN.

To *configure* service processor network settings, you can use the the Command menu’s `LC` command.

To *list* the current service processor network configuration use the `LS` command.

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The following examples show service processor LAN status for various HP nPartition servers.

**HP rp7410 or rp8400 Service Processor LAN Status**

```
MP:CM> LS

Current configuration of MP customer LAN interface
  MAC address   : 00:30:6e:05:19:ac
  IP address    : 15.99.84.140    (0x0f63548c)
  Hostname      : redxii-c
  Subnet mask   : 255.255.255.0   (0xffffff00)
  Gateway       : 15.99.84.254    (0x0f6354fe)
  Status        : UP and RUNNING
  AutoNegotiate : Enabled
  Data Rate     : 100 Mb/s
  Duplex        : Half
  Error Count   : 0
  Last Error    : none

MP:CM>
```

**HP Superdome Service Processor LAN Status**

```
GSP:CM> LS

Current configuration of GSP customer LAN interface
  MAC address : 00:10:83:27:04:5a
  IP address  : 15.99.49.129    0x0f633181
  Name        : feshd5-u
  Subnet mask : 255.255.248.0   0xfffff800
  Gateway     : 15.99.49.254    0x0f6331fe
  Status      : UP and RUNNING


Current configuration of GSP private LAN interface
  MAC address : 00:a0:f0:00:83:b1
  IP address  : 192.168.2.15    0xc0a8020f
  Name        : priv-05
  Subnet mask : 255.255.255.0   0xffffff00
  Gateway     : 192.168.2.100   0xc0a80264
  Status      : UP and RUNNING

GSP:CM>
```

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### Default Service Processor Network Settings

Table 3-5 and Table 3-6 list the default customer LAN and private LAN network settings for nPartition servers. Only Superdome servers have a private LAN.

**Table 3-5 Default Configuration for Service Processor Customer LAN (All nPartition Servers)**

| | |
|---|---|
| Customer LAN IP Address | 192.168.1.1 |
| Customer LAN Host Name | gsp0 |
| Customer LAN Subnet Mask | 255.255.255.0 |
| Customer LAN Gateway | 192.168.1.1 |

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**Table 3-6 Default Configuration for Service Processor Private LAN (HP Superdome Servers Only)**

| | |
|---|---|
| Private LAN IP Address | 192.168.2.10 |
| Private LAN Host Name | priv-00 |
| Private LAN Subnet Mask | 255.255.255.0 |
| Private LAN Gateway | 192.168.2.10 |

**Service Processor (GSP or MP)**

This procedure (Command menu, **LC** command) configures the service processor's customer LAN and private LAN network settings from the service processor Command menu.

**Step 1.** Connect to the server complex's service processor, login as an administrator, and enter **CM** to access the Command menu.

Use `telnet` to connect to the service processor, if possible.

If a service processor is at its default configuration (including default network settings), you can connect to it using either of these methods:

- Establish a direct serial cable connection through the service processor's local RS-232 port, a 9-pin D-shaped connector (DB9).

  On HP Superdome servers this port is labeled "Local RS-232". On HP rp8400 servers it is the "Local Console" port. On HP rp7410 servers use the DB9 connector that is labeled "Console".

- Access a PC or workstation on the same subnet as the service processor, modify its network routing tables to include the default customer LAN IP address, then `telnet` to the service processor. The procedure to modify networking and connect is:

1. Access a PC or workstation on the service processor's subnet.
2. Modify the network routing tables for the PC or workstation by using the **`route add 192.168.1.1 ClientName`** command, where *`ClientName`* is the network name of the PC or workstation.

   From a PC command prompt: **`route add 192.168.1.1 ClientName`**
   On an HP-UX workstation log in as `root` and use this command:
   **`/usr/sbin/route add 192.168.1.1 ClientName`**

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After you reconfigure the service processor's networking, you can remove these network routing table changes with the `route delete...` command.

3. Enter this command to confirm the new network connection to the service processor: **`ping 198.168.1.1 -n 2`**
4. Use the **`telnet 192.168.1.1`** command from the PC or workstation to connect to the service processor.

**Step 2.** From the service processor Command menu, enter **LS** to *list* the current network settings, and if needed use the **LC** command to *reconfigure* the network settings for the service processor.

You must be logged in as an administrator to use the LC command.

The LC command enables you to modify the customer LAN and/or the private LAN configuration.

You can cancel all changes to the service processor LAN configuration at any time by replying **Q** to any of the LC command's prompts.

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# Accessing nPartition Consoles

The service processor Console menu provides access to all nPartition consoles within the server complex.

Enter **CO** from the service processor Main menu to access an nPartition's console. To exit the partition console, type **^b** (**Control-b**) to return to the Main menu.

Each nPartition in a complex has a single console. However, multiple connections to the console are supported, allowing multiple users to simultaneously view the console output. Only one connection per console permits write-access.

To force (gain) console write access for an nPartition's console, type **^ecf** (**Control-e c f**).

Each nPartition console can display a variety of information about the nPartition, including:

- Partition startup, shutdown, and reset output.
- Boot Console Handler (BCH) menus, if the nPartition has not yet booted the HP-UX operating system and has completed Power-On Self Tests (POST).
- The HP-UX log-in prompt and "console shell access".

## nPartition Console Access versus Direct HP-UX Log-In

You may need to consider the following factors when deciding whether to interact with an nPartition through the service processor console interface or a direct HP-UX log-in:

- Whether you want to log your activity to the nPartition's console log (all console activity is stored at least temporarily).
- Whether HP-UX is installed, booted, and properly configured on the nPartition.

  If HP-UX is not installed on an nPartition, you should access the nPartition's console (through the service processor) in order to install and configure HP-UX.

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You should log in to HP-UX running on an nPartition when you do not need to use service processor features and do not want to record a log of your activity.

Before HP-UX has booted, the service processor nPartition consoles are the primary method of interacting with an nPartition.

After an nPartition has booted HP-UX, you should be able to connect to and log in to the nPartition by using `telnet` or `rlogin` to remotely log in.

If the HP-UX kernel booted on the nPartition does not have networking fully configured, you may need to log in using a service processor nPartition console connection to set up the nPartition's networking configuration (using `/sbin/set_parms`).

To view the /dev/console messages for HP-UX running on an nPartition, you can access the nPartition's console, view its console log, or use the `xconsole` command or `xterm -C` command and option. See the *xconsole* (1) or *xterm* (1) manpages for details.

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# Accessing the Boot Console Handler (BCH)

Each nPartition in a server complex has its own Boot Console Handler (BCH) interface. When an nPartition is booted to BCH, its BCH interface is available through the nPartition's console.

The nPartition BCH interface enables you to manage and configure the HP-UX boot process for an nPartition. You also can configure some settings for the local nPartition, get some information about the nPartition and its server complex, and perform other tasks such as reboot.

Figure 3-4 shows details on accessing and using an nPartition's BCH interface, including the following points:

- To access an nPartition's console type **CO** from the service processor (GSP or MP) Main menu.
- To force console write access, type **^ecf** (**Control-e c f**).
- To exit the console, type **^b** (**Control-b**) to return to the Main menu.

The BCH interface is available after an nPartition has been powered on, has completed all Power-On Self Tests (POST), and has proceeded to BCH. Once you begin the HP-UX boot process and load ISL, the BCH interface is no longer available.

The BCH menus and commands for nPartitions differ slightly from the commands menus for BCH on other HP 9000 server systems.

The BCH interface's **HELP** command lists BCH command or menu details.

```
Main Menu: Enter command or menu > HELP MA
---- Main Menu Help ------------------------------------------------------------

     The following submenus are available from the main menu:

     COnfiguration-------------------------------------BootID
     INformation---------------------ALL               BootTimer
     SERvice-------------BAttery      BootINfo         CEllConfig
                         CLEARPIM     CAche            COreCell
                         MemRead      ChipRevisions    CPUConfig
                         PDT          ComplexID        DataPrefetch
                         PIM          FabricInfo       DEfault
                         SCSI         FRU              FastBoot
                                      FwrVersion       KGMemory
                                      IO               PathFlag
                                      LanAddress       PD
                                      MEmory           ResTart
                                      PRocessor        TIme
```

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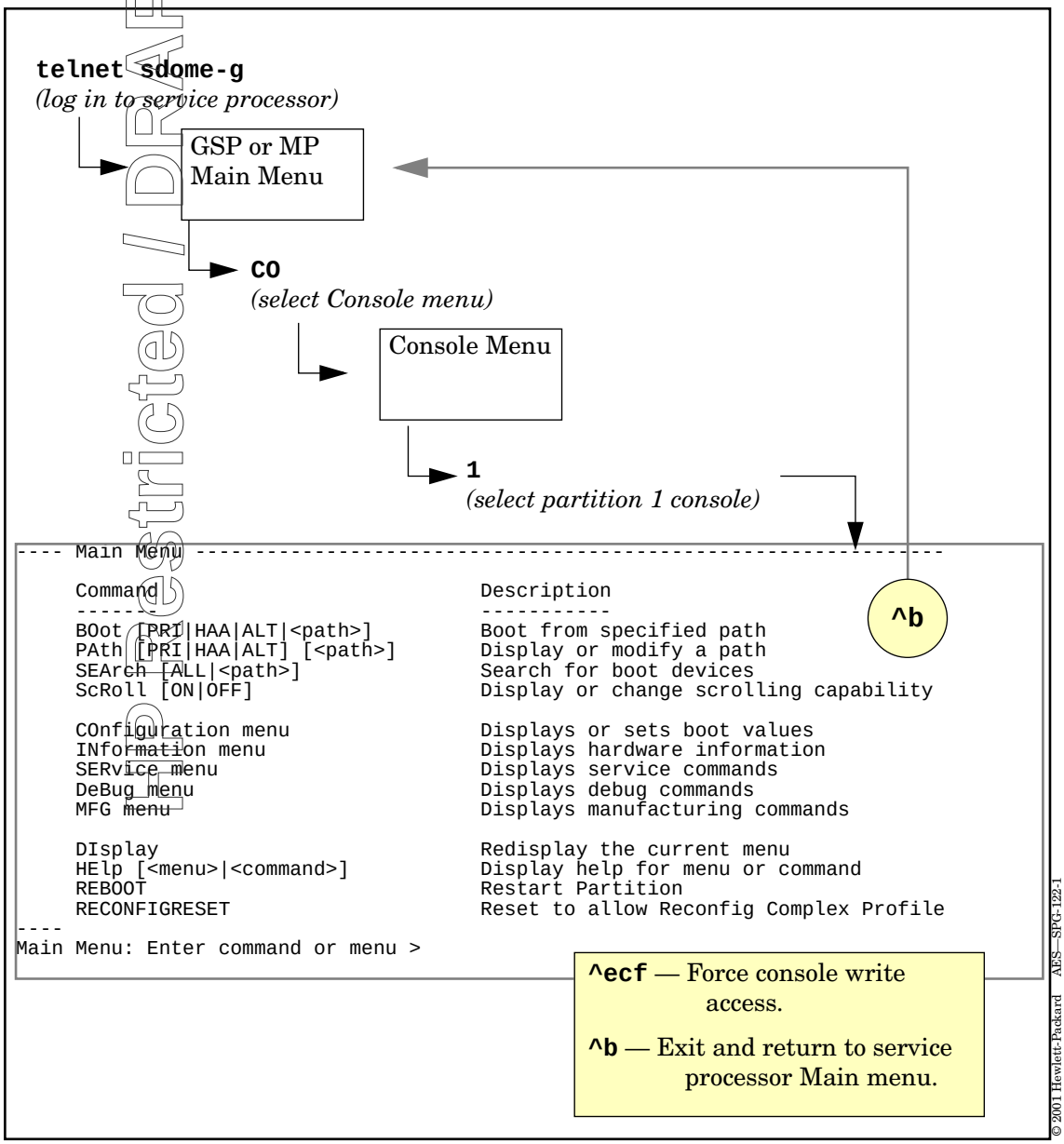
To display the *current* BCH menu and commands, type **DI**.

**Figure 3-4 Accessing an nPartition's BCH Interface**

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# Viewing Console Logs

Each nPartition in a server complex has its own console log that stores a record of the nPartition's most recent console activity.

To access an nPartition's console log, enter **CL** from the service processor Main menu and select which nPartition's console log you want to view. To exit the console log viewer, type **^b** (**Control-b**) to return to the Main menu.

When viewing an nPartition's console log, type **P** to view the previous page of the console log, or type **N** (or **Enter**) to view the next page.

When you enter an nPartition's console log viewer it displays the oldest data in the log first and allows you to page through the log to view the more recently recorded activity.

Each nPartition's console log is a circular log file that records approximately 30 to 40 pages of data. All nPartition console activity is written to this log file, regardless of whether a user is connected to the nPartition console.

As an nPartition's console log is written the oldest data in the log is overwritten by current data, as needed, so that the last 30 to 40 pages of console output always is available from the console log viewer.

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# Using Chassis Code Log Viewers

The service processor's **chassis log viewer** enables you to view chassis codes that are emitted throughout the entire server complex.

To enter the chassis log viewer enter **SL** at the service processor Main menu. To exit the viewer type **^b** (**Control-b**) to return to the Main menu.

**Chassis codes** are data that communicate information about system events from the source of the event to other parts of the server complex. Chassis code data indicates what event has occurred, when and where it happened, and its severity (the *alert level*).

All chassis codes pass from the event source through the service processor. The service processor takes any appropriate action and then reflects the chassis codes to all running nPartitions. If an nPartition is running event monitoring software, it may also take action based on the chassis codes (for example, sending notification e-mail).

System administrators, of course, may have interest in viewing various chassis codes—especially chassis codes that indicate failures or errors.

Hardware, software, and firmware events may emit chassis codes as a result of a failure or error, a major change in system state, or basic forward progress. For example: a fan failure, an HPMC, the start of a boot process, hardware power on or off, and test completion all result in chassis codes being emitted.

While HP-UX is running on an nPartition it constantly emits a "heartbeat" chassis code (at alert level 0) to indicate that the operating system still is functioning and has not hung.

**NOTE**

Each nPartition server cabinet's **front panel attention LED** is automatically *turned on* when one or more chassis codes of *alert level 2* or higher have not yet been viewed by the administrator. When this attention LED is on, entering the chassis log viewer turns the LED off.

You can remotely check this attention LED's on/off status by using the service processor Command menu's **PS** command, **G** option.

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On nPartition servers, chassis codes are recorded in the server complex **activity log** (for events of alert level 0 or alert level 1) or the **error log** (for events alert level 2 or higher).

```
GSP> SL

Chassis Logs available:

    (A)ctivity Log
    (E)rror Log
    (L)ive Chassis Logs

    (C)lear All Chassis Logs
    (Q)uit

GSP:VW> L

        Entering Live Log display

        A)lert filter
        C)ell filter
        P)artition filter
        U)nfiltered
        V)iew format selection
        ^B to Quit

Current filter: ALERTS only
```

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When you enter the chassis log viewer by entering **SL** at the service processor (GSP or MP) Main menu you can select from these viewers:

- **Activity Log Viewer**

  Allows you to browse recorded chassis codes of alert level 0 or 1.

- **Error Log Viewer**

  Allows you to browse recorded chassis codes of alert level 2 or higher.

- **Live Chassis Logs Viewer**

  Displays chassis codes in real time as they are emitted.

  By default, the live chassis code viewer has the *Alert filter* enabled, which causes it to display only the events of alert level 3 or higher.

  To view all chassis codes in real-time, type **U** for the *Unfiltered* option.

  You also can filter the live codes by cell (**C**) or nPartition (**P**).
  *Cell filter*: only display chassis codes emitted by a specific cell in the server complex. *Partition filter*: only display chassis codes emitted by hardware assigned to a specific nPartition.

When viewing chassis code logs, type **V** to change the display format. The viewers can show chassis codes in text format (**T**), keyword format (**K**), or raw hex format (**R**).

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# Using Virtual Front Panels

The Virtual Front Panel (VFP) provides ways to monitor the chassis codes for a particular nPartition or the entire server complex (all nPartitions).

The VFP presents a real-time display of activity on the selected nPartition(s) and it automatically updates when cell and nPartition status change.

To access the VFP feature, enter **VFP** from the service processor Main menu. To exit the VFP, type **^b** (**Control-b**) to return to the Main menu.

When you access a Virtual Front Panel, you can either select the nPartition whose VFP you want to view or select the system VFP to view summary information for all nPartitions in the server complex.

```
E indicates error since last boot
    Partition 0  state            Activity
    -------------------           --------
    Cell(s) Booting:    710 Logs

  #  Cell state                   Activity
  -  ----------                  --------
  0  Early CPU selftest           Cell firmware test                232  Logs
  1  Early CPU selftest           Processor test                    230  Logs
  2  Memory discovery             Physical memory test              242  Logs









GSP:VFP (^B to Quit) >
```

When you access a service processor using a single-partition user account, using the VFP feature enables you to view only the VFP for the nPartition to which you have access.

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# 4 Boot and Reset Overview for nPartitions

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This chapter presents an overview of booting and reset concepts and issues for HP nPartition servers.

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# Types of Booting and Resetting for nPartitions

All standard boot and reboot methods are supported for HP nPartition servers, though some boot and reset procedures differ slightly or use different tools than on other HP servers.

HP's nPartition servers also provide two special types of reboot and reset for managing nPartitions: performing a *reboot for reconfig*, and resetting an nPartition to a *ready for reconfig* state.

- **Reboot for Reconfig**

  After you assign a cell to an nPartition, or remove an active cell from a partition, you can perform a reboot for reconfig of the partition to complete the cell addition or removal.

  Performing a reboot for reconfig resets all cells in an nPartition, completes any pending partition changes (adding or removing cells), and reboots the partition to its Boot Console Handler interface.

  If a partition is configured to boot HP-UX automatically, it can do so immediately following a reboot for reconfig.

  The `shutdown -R` command performs a reboot for reconfig of the local partition.

- **Ready for Reconfig State**

  When you reset an nPartition to a ready for reconfig state, all cells in the partition are reset and any partition changes take place, but the partition and all its cells remain inactive at boot-is-blocked (BIB).

  Resetting an nPartition to ready for reconfig prevents the partition from automatically booting to its BCH interface or HP-UX.

  To make a partition boot past ready for reconfig, use the service processor Command menu's `BO` command. The `BO` command makes the partition active by allowing its cells to boot past BIB, rendezvous, and boot to the BCH interface (and, if configured, automatically boot HP-UX).

  When a partition is at a ready for reconfig state you can add or remove cells from the partition from a different, remote partition within the server complex.

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The `shutdown -R -H` command, the BCH interface's `RECONFIGRESET` command, and the service processor Command menu's `RR` command all reset a partition to ready for reconfig state.

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### nPartition Booting Summary

The following list summarizes all types of booting, rebooting, and resetting that are supported for HP hard-partitionable systems.

When rebooting HP-UX on an nPartition under normal circumstances (when not reconfiguring or halting it) use the `shutdown -r` command.

- **Reboot**—Shuts down HP-UX and reboots the partition.

  Only the partition's active cells are rebooted.

  To perform a standard reboot of a partition use the `shutdown -r` command.

- **Halt**—Shuts down HP-UX, halts all processing on the partition, and does not reboot.

  To perform this task use the `shutdown -h` command.

  To reboot a halted partition use the service processor Command menu's `RS` command.

- **Reset**—Resets the partition immediately.

  Only the partition's active cells are reset.

  You can reset a partition using the BCH interface's `REBOOT` command or the service processor Command menu's `RS` command.

  The `RS` command *does not check* whether the specified partition is in use or running HP-UX—be certain to correctly specify the partition.

- **Boot**—Boots an inactive partition past the *ready for reconfig* state.

  The partition's cells proceed past boot-is-blocked (BIB), rendezvous, and the partition boots to the BCH interface.

  To boot an inactive partition use the service processor Command menu's `BO` command.

- **Reboot for Reconfig**—Shuts down HP-UX, resets all cells assigned to the partition, performs any partition reconfigurations, and boots the partition back to the BCH interface.

  All cells—including any inactive cells and all newly added or deleted cells—reboot and are reconfigured. All cells with a "y"

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*use-on-next-boot* setting participate in partition rendezvous and synchronize to boot as a single partition.

To perform a reboot for reconfig use the `shutdown -R` command.

- **Ready for Reconfig State**—Shuts down HP-UX, resets all cells assigned to the partition, performs any partition reconfigurations, and keeps all cells at a boot-is-blocked (BIB) state, thus making the partition and all of its cells inactive.

  When a partition is in a ready for reconfig state, you can reconfigure (or remove) the partition from a remote partition.

  To put a partition into a ready for reconfig state use the `shutdown -R -H` command, the BCH interface's `RECONFIGRESET` command, or the service processor Command menu's `RR` command.

  To boot an inactive partition past ready for reconfig, use the service processor Command menu's `BO` command.

- **Transfer-of-Control (TOC) Reset**—Immediately performs a TOC reset, which resets the partition and allows a crash dump to be saved.

  If crash dump is configured for HP-UX on a partition, then when you TOC the partition while it is running HP-UX the partition performs a crash dump and lets you select the type of dump.

  To perform a TOC reset use the service processor Command menu's `TC` command.

  HP nPartition systems do not have TOC buttons on the server cabinet hardware.

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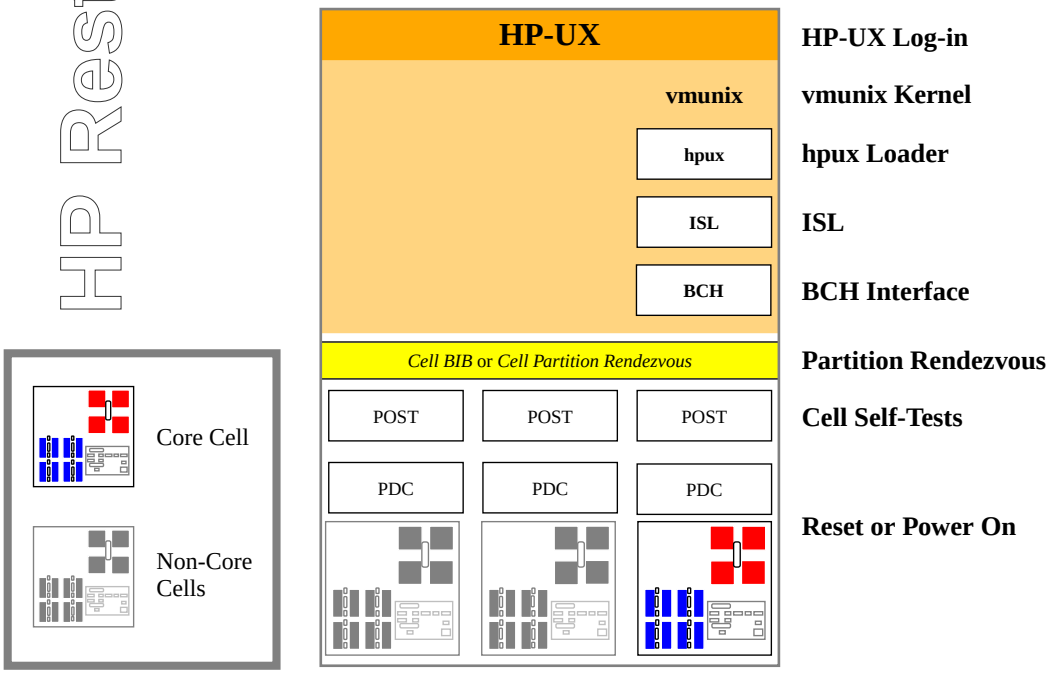
# Boot Process for nPartitions, Cells, and HP-UX

On HP nPartition servers, each partition's cells go through the stages described here when proceeding from being powered on or reset to forming an nPartition (partition rendezvous) to booting the BCH interface and booting the HP-UX operating system on a partition.

The boot process for nPartitions is similar to the process on other HP servers. However, on HP nPartition servers, each cell boots and performs self tests (POST) separately, and one or more cells rendezvous to form a partition before providing a BCH interface for the partition.

Unique boot features of nPartitions include the ability to boot to BCH or HP-UX when some of a partition's cells are powered off, if a core cell has booted in the partition. Likewise, inactive cells in a partition can be reset and power cycled without affecting the rest of the partition.



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Each nPartition goes through the following process, from power on to booting HP-UX:

1. **Power On or Reset**

   The boot process starts when any of the following events occurs:

   - A partition is reset or rebooted.
   - The entire server complex is powered on.
   - Power is turned on for components in the partition (such as cells).

2. **Processor Dependent Code (PDC)**

   The monarch processor on each cell runs its own copy of the PDC firmware.

   a. The boot-is-blocked (BIB) flag is set for the cell.

      The BIB flag remains set until the service processor (GSP or MP) clears it, allowing the cell to boot as part of an nPartition.

   b. Another flag is set for the cell, indicating that the service processor can post a new copy of the complex profile to the cell.

      The cell's complex profile is updated later in the boot process, after it completes self-tests.

3. **Power-On Self-Test (POST)**

   Each cell performs self-tests that check the processors, memory, and firmware on the cell.

   If a component fails self-tests, it is deconfigured and if possible the cell continues booting.

   Following this step, all components in the cell are known and are tested and the cell reports its hardware configuration to the service processor.

4. **I/O Discovery**

   Each cell performs I/O discovery and configures I/O busses, including: any system bus adapter (the SBA for an I/O card cage) and its local bus adapters (LBAs, one per PCI card slot in the card cage).

   Following this, any I/O busses connected to the cell are known and configured by the cell.

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5. **Boot-Is-Blocked (BIB) or Partition Rendezvous**

   Each cell either will remain at a boot-is-blocked state (spins at BIB) or will rendezvous with any other available cells in the partition.

   Cells that remain at BIB are *inactive*, and cells that rendezvous into the partition are *active*.

   - A cell remains at boot-is-blocked (and thus is *inactive*) in any of the following cases:
     - — The cell has a “n” use-on-next-boot setting.
     - — The cell boots too late to participate in partition rendezvous.
     - — The cell’s partition has been reset to a ready for reconfig state.

       In this case, all of the partition’s cells remain at boot-is-blocked.
     - — The cell fails self-tests that cause the cell to not be usable in the partition.
   - Partition rendezvous of all cells occurs in the following manner:
     - — Partition rendezvous begins when the first of the partition’s cells has completed self-tests and I/O discovery.
     - — The partition is allowed up to ten minutes for all cells with a “y” use-on-next-boot setting to participate in partition rendezvous.
       - — Once all assigned cells with a “y” use-on-next-boot setting have entered the rendezvous stage, partition rendezvous can complete.

         All cells participating in rendezvous are active cells whose resources (processors, memory, I/O) are used by the partition.
       - — If any cells with a “y” use-on-next-boot setting *do not* report to rendezvous, then ten minutes after rendezvous began the cells that have not reported become inactive cells, and all other reporting cells complete rendezvous and are active.

         The inactive cells’ resources are not available to be used by the partition, although the cells still are assigned to the partition.

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6. **Boot Console Handler (BCH)**

   The BCH interface provides the main method for interacting with a partition during its boot process.

   BCH runs on top of PDC, and it provides menus for getting partition status, for configuring partition boot settings, and for booting HP-UX and rebooting the partition.

   One processor on the partition's core cell runs BCH and all other processors in the partition are idle while the BCH interface is available.

   An nPartition can immediately proceed past BCH to boot HP-UX when the partition's boot paths are set and boot actions for the paths are configured to automatically boot.

7. **Initial System Loader (ISL) and Secondary System Loader (hpux)**

   In most situations you do not need to use the ISL and hpux interfaces.

   However, when using the BCH interface's `BOOT` command you can select to stop at the ISL prompt to perform more detailed booting tasks.

   For example, you can use the ISL interface to boot HP-UX in single-user or LVM-maintenance mode, or to boot an HP-UX kernel other than /stand/vmunix.

8. **HP-UX Operating System**

   The HP-UX operating system boots on a partition after ISL and the Secondary System Loader (hpux) specify which kernel is to be booted.

   By default, and in most situations, the /stand/vmunix kernel is selected.

   For example, when you configure boot paths and boot actions to automatically boot HP-UX, the ISL and hpux loaders specify that the /stand/vmunix kernel is booted.

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## Overview of nPartition Boot Features

This section lists several boot issues particular to HP nPartition servers.

Each nPartition is booted, rebooted, shut down, and reset individually. In many situations you can boot and reboot nPartitions using the same basic procedures that are used on other HP servers.

The following list describes notable features related to booting, rebooting, and power cycling nPartitions:

- Each nPartition can boot and reboot independently of other partitions. Resetting one partition has no effect on the others.
- You can perform many reset and power cycling tasks remotely.

  You can reset and control power from an nPartition server's service processor Command menu, from the BCH interface for a partition, or from HP-UX running on an nPartition.
- In order to contribute resources to a partition, the cells (and I/O chassis) assigned to the partition must be powered on and booted in time to participate in partition rendezvous.

  Otherwise, the cells will remain inactive (though still assigned to the partition) and their processors, memory, and any I/O will not available for use.
- Three boot path variables—PRI, HAA, and ALT—are supported for each nPartition.

  PRI typically is the primary HP-UX boot device, HAA typically is a mirror of the root volume, and ALT is for install or recovery media such as tape or DVD-ROM devices.
- You can specify a *boot action* for each boot path variable. The boot action determines what action (for example: boot HP-UX) is taken when the partition boots and reaches the BCH interface.

  To set boot actions use the BCH Configuration menu's PathFlags (PF) command. The `setboot` command can configure the PRI actions only.

  When a partition boots to BCH, it attempts to perform the PRI path's boot action. The HAA path and ALT path boot actions also can be attempted, in that order, depending on the PRI settings.

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- *Before powering off* a cell, the cell should be inactive; unassigned; or assigned to a partition that either has been shut down and halted or has been reset to a ready for reconfig state.

  Powering on or powering off an I/O chassis *resets the cell* to which it is connected (if any). Follow the same guidelines for power cycling I/O chassis that you follow for power cycling cells.

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# Tools for Managing nPartition Booting

HP nPartition servers support the following software tools for booting and resetting nPartitions and for configuring and managing partition boot settings.

These tools overlap in some of the functionality they provide, but each has unique capabilities.

The primary tools for managing nPartition booting are shown below.

- **Service Processor (GSP or MP)**—Using a server complex's service processor menus, you can reset partitions, put partitions into a ready for reconfig state, and TOC the partitions in the complex.

  The service processor also provides power on and power off commands for power cycling server hardware components.

- **Virtual Front Panel (VFP)**—Each nPartition has its own VFP that displays current cell and partition boot states and activities.

  For each server complex you also can access a system VFP that gives a live partition boot state and activity status for all nPartitions in the complex.

- **Boot Console Handler (BCH)**—Each partition's BCH interface provides commands for booting HP-UX, rebooting the partition, and putting the partition into a ready for reconfig state.

  You also can configure boot-related settings and check the partition's hardware and boot-setting configurations using BCH menus.

- **HP-UX System Loaders (ISL and hpux)**—You can use system loaders to list files that reside on a boot device, such as kernel files in /stand, and can specify boot arguments to the hpux loader.

  You can access the ISL and hpux loaders after issuing the BCH interface's `BOOT` command, when BCH gives you the following option:

  ```
  Do you wish to stop at the ISL prompt prior to booting? (y/n)
  ```

  Replying "y" (yes, do stop at ISL) allows you to interact directly with a boot device's Initial System Loader (ISL) and the Secondary System Loader (hpux).

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Replying "n" (no, do not stop at ISL) skips the ISL prompt and proceeds to boot HP-UX (/stand/vmunix) on the partition.

See the *isl* (1M) and *hpux* (1M) manpages for details.

- **HP-UX utilities**—Several HP-UX utilities allow you to check and set a partition's HP-UX boot options; check the boot settings of other partitions in the server complex; and perform reboot, shutdown, and reboot for reconfig tasks.

  The `reboot`, `shutdown`, `parmodify`, `parstatus`, and `setboot` commands provide these features. For details see the command manpages.

  The Partition Manager utility (`/opt/parmgr/bin/parmgr`) also provides some boot configuration capabilities; details are available in its online help.

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# Configuring and Planning Partition Boot Settings

Each partition has its own collection of boot-related settings that specify which hardware manages the boot process (the core cell), how the boot process proceeds (automatically boot HP-UX, or wait for BCH commands), and whether cells are configured as active cells when the partition boots.

You can configure each partition's boot settings by using the partition's BCH interface or by running HP-UX utilities on the partition.

By using the `parmodify` HP-UX command or Partition Manager, you also can configure some boot settings for remote (non-local) partitions in the same server complex.

When you initially create each nPartition you should set the partition's boot paths and boot actions, and other settings as needed.

You can reconfigure boot settings at any time to change the partition's boot behavior, specify different boot devices, or adjust settings based on partition configuration changes.

The following sections give details on configuring boot settings.

- *Configurable Boot Settings* on page 132
- *Guidelines for Configuring Partition Boot Settings* on page 134

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## Configurable Boot Settings

You can configure the following boot settings for each partition.

- **Boot Device Paths**

  You can set boot device paths to reference the hardware paths where bootable devices reside within the local nPartition.

  The boot device paths include the primary boot device (PRI boot path), the high-availability alternate device (HAA boot path, such as a mirror of the root volume), and the alternate device (ALT boot path, such as an install or recovery device).

  The PRI path is the default device booted by the BCH interface's `BOOT` command.

  You can set boot paths using the BCH interface, the `parmodify` command, and Partition Manager. The `setboot` command can set the PRI and ALT paths only.

- **Boot Actions**

  Each boot device path has an associated boot action, which is established by the path's "path flag" setting. The boot actions (path flag settings) are referenced automatically when a partition initially boots to the BCH interface.

  Boot actions have no effect on boot behavior when you manually boot HP-UX using the BCH interface's `BOOT` command.

  The boot action for the PRI boot path establishes what the partition does when it boots and first reaches the BCH interface: boot the PRI device, go to the BCH Main menu, or skip the PRI path and attempt to perform the HAA path's boot action. You also can specify what action to take if an attempt to boot a device fails (either go to BCH, or try the next path).

  Depending on the PRI path flag setting, the HAA boot action may be referenced. Likewise, the HAA setting determines whether the ALT boot actions may be referenced.

  You can set boot actions using the BCH Configuration menu's PathFlags (`PF`) command. The `setboot` command can configure only the PRI actions from HP-UX.

  For details use the BCH Command menu's `HELP PF` command.

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You can stop a partition from automatically booting, and instead access the partition's BCH interface, by typing a key within ten seconds of the partition booting to BCH.

```
    Primary Boot Path:  0/0/1/0/0.8
         Boot Actions:  Boot from this path.
                        If unsuccessful, go to BCH.

Attempting to boot using the primary path.
------------------------------------------------------------

 To discontinue, press any key within 10 seconds.
```

- **Core Cell Choices**

  The core cell is the cell that "runs" the partition before it boots HP-UX. A processor on the core cell serves as the monarch processor that runs Boot Console Handler (BCH). The core cell is the one whose core I/O is active for the partition.

  One cell is selected as the **active core cell** for the partition when the partition boots. By default, the lowest numbered eligible cell in the partition is chosen. To be eligible the cell must: be active, have a connection to functioning core I/O, and be assigned to the partition.

  You can designate up to four **core cell choices**, which are considered in the order you specify as candidates to be selected as the active core cell for the partition.

  If none of the core cell choices is eligible to serve as the core cell, then the partition attempts to select a core cell using the default algorithm (lowest numbered eligible cell).

  When no active cell in a partition can be selected, the partition will remain at a ready for reconfig state and cannot boot to BCH.

- **Cell Use-on-Next-Boot Value**

  Each cell in a partition has an associated *use-on-next-boot* value that determines whether the cell's resources are used by the partition.

  This setting does not affect the cell's partition assignment. The use-on-next-boot value only determines whether the cell is an *active* or *inactive* member of the partition when the partition boots.

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When a cell's use-on-next-boot value is "y" (use the cell), the cell can participate in partition rendezvous and become an *active* member of the partition, which enables its processors, memory, and any connected I/O to be made available for use by the partition.

When a cell has a use-on-next-boot value of "n" (do not use the cell), the cell cannot participate in partition rendezvous so it will be an *inactive* member of the partition when the partition boots: all processors, memory, and I/O will not be made available.

After changing a cell's use-on-next-boot value you might need to reset the partition so that all cells have a chance to either participate in partition rendezvous or remain inactive at BIB. (For example, if the partition is in a ready for reconfig state, just boot it using the service processor Command menu's `BO` command; but if the partition is active and has booted HP-UX then perform a reboot for reconfig using the `shutdown -R` command.)

The use-on-next-boot setting does not directly affect the partition's boot behavior, but it will cause I/O connected to a cell to be unavailable when the cell boots with a "n" use-on-next-boot value.

For details on configure these boot-related settings for an nPartition refer to the procedures for booting and resetting nPartitions.

## Guidelines for Configuring Partition Boot Settings

The following guidelines are points to consider when configuring boot settings for the nPartitions in your server complex.

- Configure HAA and ALT boot devices in addition to the PRI device.

  By configuring HAA and ALT boot device paths, you establish additional bootable devices that provide redundancy in case the PRI device fails.

  Also configure the path flags for the boot paths, to allow the HAA device to boot automatically if the device at the PRI path cannot boot.

- Ensure that the core I/O, PRI boot device, and network card(s) all are connected to same cell (the core cell).

  This configuration ensures that the core cell is directly connected to the I/O required for booting the partition and providing network connections. Having such a configuration eliminates the requirement for multiple cells to be functional to provide basic partition services.

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- Have multiple core cells available within each partition, if possible.

  In order to have multiple core cell choices, the partition must have at least two cells, each connected to an I/O chassis and core I/O.

  Having such a configuration provides redundancy and potentially improved system availability. If one core cell has a failure or otherwise cannot serve as the active core cell, the second core-capable cell can serve as the active core cell.

  *Disregard this guideline if configuring multiple partitions in an HP rp8400 server complex.* HP rp8400 servers have up to two core-capable cells only, so following this guideline would require having only one nPartition in the server complex.

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## Checklist for Booting Partitions

Before you boot a partition, check the items listed here.

- All cells in the partition that have a “y” use-on-next-boot value should be powered on.

  If any cells that are set to be used are powered off, the partition will take longer to boot.

  During partition rendezvous, the partition will wait up to *10 minutes* for all cells that are designated to be used. Any cells not powered on will not be active or available in the partition.

- All I/O chassis and devices for the partition’s active cells should be powered on.
- If any cells that have a “y” use-on-next-boot value are inactive, perform a reboot for reconfig of the partition (`shutdown -R`) to allow them to reset and become active during partition rendezvous.
- All complex profile information for the partition must be coherent.

  This means all cells assigned to the partition must have identical complex profile information (Partition Configuration Data).

  After you add a cell or remove and active cell from a partition, you must perform a reboot for reconfig of the partition (`shutdown -R`) to synchronize the complex profile data throughout the partition. The reboot for reconfig also causes all the partition’s cells to reboot and allows cells to go through the partition rendezvous procedure.

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# Monitoring Partition Boot Activity

On HP nPartition servers you can monitor the partition boot process—from power-on or reset to HP-UX start-up—using the Virtual Front Panel (VFP) view of the partition.

Each partition has its own VFP that displays details about the partition's cells and the partition's boot state and activity.

**NOTE** After you add or remove cells from the partition, you must exit and re-enter the partition's VFP to update the list of cells the VFP displays.

**Service Processor (GSP or MP)**

Use the following procedure (service processor Main menu, **VFP** option) to access a partition Virtual Front Panel for monitoring the partition's boot status.

**Step 1.** From the Main menu, enter **VFP** to select the Virtual Front Panel option.

```
 GSP MAIN MENU:

Utility Subsystem FW Revision Level: SR_XXXX_D

        CO: Consoles
       VFP: Virtual Front Panel
        CM: Command Menu
        CL: Console Logs
        SL: Show chassis Logs
        HE: Help
         X: Exit Connection

GSP> VFP
```

If you are accessing the service processor using a single-partition-user account, selecting the VFP option takes you directly to the partition's Virtual Front Panel.

If accessing the GSP using an operator or administrator account, you can select the VFP for any single partition, or can select a *system VFP* that displays the partition state and activity for all partitions within the server complex.

**Step 2.** Select the partition you wish to monitor.

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Skip this step if you are accessing the service processor using a single-partition-user account.

```
 Partition VFP's available:

     #   Name
    ---  ----
     0)  jules00
     1)  jules01
     S)  System (all chassis codes)
     Q)  Quit

GSP:VFP> 1
```

**Step 3.** View the VFP details for information about the partition and its current boot state.

To exit the VFP and return to the service processor main menu, type **^b** (**Control-b**).

The VFP provides information about the partition state, partition activity, each cell's state, and each cell's activity. The VFP display updates as the cell or partition state and activities change.

```
E indicates error since last boot
     Partition 1  state            Activity
     -------------------           --------
     Cell(s) Booting:     57 Logs

  #  Cell state                    Activity
  -  ----------                    --------
  4  Booting                       Cell firmware test                28  Logs
  6  Booting                       Cell firmware test                28  Logs


GSP:VFP (^B to Quit) >
```

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## Troubleshooting Boot Issues

On HP nPartition servers you might encounter different boot issues than on other HP servers.

The following boot issues are possible on nPartition servers.

- **Problem:** Not all cells boot to join (rendezvous) a partition.

  **Causes:** Some cells may have their use-on-next-boot value set to "n" (do not use), or the cells may have be powered off, or the cells may have booted too late to participate in partition rendezvous, or the cells have failed self-tests and cannot be used.

  **Actions:** Check the cell use-on-next-boot values and change them to "y" as needed then reboot for reconfig (`shutdown -R`). Check cell power (`frupower -d -C`) and power on any cells as needed, then reboot for reconfig.

  As the partition's cells reboot, observe the boot progress from the partition's VFP and note and problems cells have proceeding from one boot state to the next; as needed review chassis logs and error logs using the service processor Show Chassis Logs (`SL`) menu.

- **Problem:** An nPartition takes a long time to boot (over ten minutes).

  **Causes:** One or more cells assigned to the partition that have a "y" use-on-next-boot value has not booted to participate in partition rendezvous, thus causing the rest of the partitions cells to wait for ten minutes for the cell to report.

  For example, the cell might not be installed, might be powered off, or might have been powered on or reset too late to rendezvous with the other cells.

  **Actions:** You can avoid the delay by performing any of the following actions, as needed. Perform a reboot for reconfig following any changes you make.

  — Set the cell's use-on-next-boot value to "n" (do not use).

  — Power on the cell.

  — Unassign (remove) the cell from the partition.

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- **Problem:** An nPartition does not boot to BCH and instead all cells remain at a boot-is-blocked (BIB) state.

  **Causes:** The partition has been reset to a ready for reconfig state, or no valid core cell is available to the partition.

  **Actions:** If the partition was reset to a ready for reconfig state, use the service processor Command menu's `BO` command to boot the partition base boot-is-blocked (to allow it to boot to its BCH interface).

  If no valid core cell was available to the partition when it booted, check the power for all core cell choices (a cell might be powered off) and power it on if needed.

  Also review the chassis logs for the partition to search for any core cell problems and failures.

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# Boot States and Activities for Partitions and Cells

On HP nPartition servers, the cell and nPartition boot process proceeds from one boot state to the next; cells and partitions complete various boot activities within each boot state before proceeding to the next boot state.

You can view current details about partition and cells boot states and activities by viewing the partition's Virtual Front Panel. From the service processor (GSP or MP) Main menu enter **VFP** to access the VFPs that are available for the server complex.

Table 4-1 on page 142 presents the partition and cell states and activities that you can observe from a partition's Virtual Front Panel.

You can view a Virtual Front Panel for a specific partition that includes details for all cells in the partition, as shown below.

```
E indicates error since last boot
     Partition 0  state            Activity
     -----------------            --------
     Cell(s) Booting:    904 Logs

  #  Cell state                    Activity
  -  ----------                    --------
  0  Late CPU selftest             Processor test                    299  Logs
  2  Late CPU selftest             Processor test                    299  Logs
  4  Memory discovery              Physical memory test              304  Logs




GSP:VFP (^B to Quit) >
```

You also can view a system-wide VFP, which shows a summary of each partition's current state and its activity.

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Inactive cells remain at a “Boot Is Blocked (BIB)” state following I/O discovery and do not participate in partition rendezvous.

**Table 4-1 HP nPartition and Cell Boot States and Activities**

| Partition State | Partition Activity | Cell States | Cell Activities |
|---|---|---|---|
| **Cell(s) Booting** | | Booting | Cell firmware configuration, Cell firmware test, Cell PDH controller configuration |
| Cell(s) Booting | | Early CPU self-test | Processor test, Cell firmware test, Processor firmware slave rendezvous |
| Cell(s) Booting | | Memory discovery | Physical memory test |
| Cell(s) Booting | | Late CPU self-test | Processor test, Cell firmware test, Processor firmware slave rendezvous |
| Cell(s) Booting | | I/O discovery | I/O system bus adapter configuration, I/O local bus adapter configuration |
| Cell(s) Booting | | Remote fabric initialization | Partition rendezvous slave rendezvous |
| Memory Interleave | Memory controller configuration | Cell has joined partition | |
| **At Boot Console Handler (BCH)** | Partition firmware | Cell has joined partition | |
| ISL Menu | | Cell has joined partition | |
| HPUX Loader Init | | Cell has joined partition | |

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**Table 4-1 HP nPartition and Cell Boot States and Activities**

| Partition State | Partition Activity | Cell States | Cell Activities |
|---|---|---|---|
| HPUX Launch | Processor system initialization | Cell has joined partition | |
| HPUX Launch | Partition IPL launch configuration | Cell has joined partition | |
| HPUX Launch | Processor display_activity update | Cell has joined partition | |
| HPUX init process start | | Cell has joined partition | |
| **HPUX heartbeat** | | Cell has joined partition | |

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# 5 Procedures for Booting and Resetting nPartitions

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This chapter presents procedures for booting and resetting nPartitions.

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# Accessing a Partition Console and BCH Interface

Each nPartition has its own Boot Console Handler (BCH) interface that provides you a method for interacting with the partition before HP-UX has booted on it.

You must access an nPartition's console and BCH interfaces through the server complex's service processor (GSP or MP). See *Service Processor* below for a detailed procedure.

On nPartition servers, each partition's BCH interface is available through the partition's console before HP-UX has booted. The BCH interface enables you to manage the partition's HP-UX boot process and to configure various boot-related settings.

**NOTE**

Always log in to a server complex's service processor from a tty (not console) login session. You can check your current login terminal using the **`who -m`** command.

Do not log in to a service processor from an nPartition console connection. Any use of the **^b** (**Control-b**) console exit sequence would exit the original console login—not the subsequent console-based login to the service processor—thus potentially stranding the console-based login (for example, if it too were accessing a console).

**Service Processor**

The following procedure (log in to service processor, select Console menu, select a partition) accesses a partition's console and BCH interface using the server complex's service processor.

**Step 1.** Log in to the service processor (the GSP or MP) for the partition's server complex.

You can connect to the service processor using a direct physical connection, or using `telnet` for a remote connection.

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In most situations you can `telnet` to the service processor.

```
# telnet sdome-s
Trying...
Connected to sdome-s.rsn.hp.com.
Escape character is '^]'.
Local flow control off

GSP login: Accountname
GSP password:

                          Welcome to
       Superdome's Guardian Service Processor
```

**Step 2.** Select the Console menu (**CO**) from the service processor's Main menu.

The Console menu is the method for accessing nPartition consoles.

```
 GSP MAIN MENU:

Utility Subsystem FW Revision Level: SR_XXXX_D

       CO: Consoles
      VFP: Virtual Front Panel
       CM: Command Menu
       CL: Console Logs
       SL: Show chassis Logs
       HE: Help
        X: Exit Connection

GSP> CO
```

If you are accessing the service processor using a single-partition-user account, selecting the `CO` (console) option takes you directly to the partition's console.

If using an operator or administrator account, you can access the console for any of the partitions within the server complex.

**Step 3.** At the Console menu, enter the partition number for the partition whose console (and BCH interface) you wish to access.

Skip this step if you are accessing the service processor using a single-partition-user account.

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If using an operator or administrator account, select the partition whose console you wish to access.

```
GSP> CO

    Partitions available:

     #   Name
    ---  ----
     0)  jules00
     1)  jules01
     Q)  Quit

    Please select partition number: 1

       Connecting to Console: jules01

       (Use ^B to return to main menu.)

       [A few lines of context from the console log:]

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     SERvice menu                      Displays service commands

     Display                           Redisplay the current menu
     HELp [<menu>|<command>]           Display help for menu or command
     REBOOT                            Restart Partition
     RECONFIGRESET                     Reset to allow Reconfig Complex Profile
----
Main Menu: Enter command or menu >

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

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The console displays the last 10 lines of console output when you connect to it. This provides you a view of the most recent console activity.

**Step 4.** Gain interactive access to the partition console.

Press **Enter** to access the partition console's currently available prompt, if any. You will have either interactive or non-interactive access, as described in the sections *Interactive Console Access* and *Non-Interactive Console Access* in this step.

To exit the partition console and return to the service processor Main menu, type **^b** (**Control-b**) at any time.

### Interactive Console Access

Typically the BCH interface, ISL interface, or the HP-UX login or command prompt is available from the partition console.

- **When a partition is at the BCH interface** you can access BCH commands from the partition's console and can reboot BCH if needed.

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- **When a partition has booted to ISL** you can use the `EXIT` command to exit ISL and return to the partition's BCH interface.
- **When a partition has booted HP-UX**, in order to access the BCH interface you must reboot HP-UX (`shutdown -r`) and if necessary interrupt the automatic boot process.

### Non-Interactive Console Access

In the following situations you cannot interact with the partition's console. In these cases you can wait until the console is interactive or can force interactive access.

- **When the partition is resetting or is booting HP-UX** you cannot interact with software running on the partition.

  Once the partition has completed resetting, or has completed booting HP-UX, you can interact with the partition's BCH or HP-UX prompts.

  To determine an nPartition's boot state use the partition's Virtual Front Panel (the VFP menu, available from the service processor Main menu).

- **When another user already is attached to the console** you can access the partition's console in spy (read-only) mode or can force write access by typing **`^ecf`** (**Control-e c f**).

  Spy mode allows you to view console information but does not enable you to enter commands. If you type when accessing a partition console in spy mode, the console prints the following message.

```
[Read-only - use ^Ecf to attach to console.]
```

  When in spy mode, you can force access to the partition's console by typing **`^ecf`** (**Control-e c f**). Doing this provides you interactive console access and forces ("bumps") the user who was using the console into spy mode.

```
[Bumped user - Admin.]
```

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# Finding Bootable Devices

You can search for and find bootable devices for an nPartition by using the BCH interface's SEARCH command. This command searches for and reports all bootable devices connected to any of the partition's currently active cells.

**NOTE**

You cannot access any I/O connected to an nPartition's *inactive* cells (cells not being used for the current partition boot) or cells *not assigned* to the local nPartition.

As a consequence, the BCH SEARCH command does not report any devices connected to cells that are not currently assigned and active in the local nPartition.

**BCH**

This procedure (BCH Main menu, SEARCH command) finds and lists the bootable devices that are available to an nPartition.

**Step 1.** Log in to the server complex's service processor (GSP or MP) and access the partition's console.

From the partition console you access the partition's BCH interface to search for bootable devices.

If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

**Step 2.** From the BCH interface's Main menu, issue the SEARCH command to find and list bootable devices in the partition.

When accessing the partition's BCH interface, if you are not at the BCH Main menu then enter MA to return to the Main menu.

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The SEARCH command reports all potential boot devices it locates.

```
---- Main Menu -------------------------------------------------------------

     Command                              Description
     -------                              -----------
     BOot [PRI|HAA|ALT|<path>]            Boot from specified path
     PAth [PRI|HAA|ALT] [<path>]          Display or modify a path
     SEArch [ALL|<path>]                  Search for boot devices
     ScRoll [ON|OFF]                      Display or change scrolling capability

     COnfiguration menu                   Displays or sets boot values
     INformation menu                     Displays hardware information
     SERvice menu                         Displays service commands

     DIsplay                              Redisplay the current menu
     HElp [<menu>|<command>]              Display help for menu or command
     REBOOT                               Restart Partition
     RECONFIGRESET                        Reset to allow Reconfig Complex Profile
----
Main Menu: Enter command or menu > SEARCH

Searching for potential boot device(s)
This may take several minutes.

To discontinue search, press any key (termination may not be immediate).


   Path#  Device Path (dec)                    Device Type
   -----  -----------------                    -----------
   P0     0/0/1/0/0.15                         Random access media
   P1     0/0/1/0/0.12                         Random access media
   P2     0/0/1/0/0.11                         Random access media
   P3     0/0/1/0/0.9                          Random access media
   P4     0/0/1/0/0.8                          Random access media
   P5     0/0/1/0/0.6                          Random access media


Main Menu: Enter command or menu >
```

The SEARCH command lists up to the first 20 potential boot devices that it locates, and lists each with a path number (P0 through P19).

To boot a device that was reported by the SEARCH command, specify the path number or the full device path. For example, BOOT P0 would boot the path listed as path number P0.

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# Booting HP-UX on an nPartition

nPartitions boot and reboot HP-UX independently from each other.

You can boot HP-UX on an nPartition using the BCH interface's BOOT command.

Each partition's BCH interface is available through its console. All nPartition consoles are available from the complex's service processor (GSP or MP) Console menu.

An nPartition will *automatically boot HP-UX* when its boot paths (PRI, HAA, ALT) and corresponding boot actions are appropriately set. For details refer to the section on configuring Autoboot settings.

On HP Superdome servers only, if one of the partition's components fails self-test and AUTOSTART is OFF then the partition stops booting at the BCH interface.

**BCH**

The following procedure (BCH interface **BOOT** command) boots HP-UX on an nPartition using the partition's BCH interface.

**Step 1.** Log in to the server complex's service processor (GSP or MP), access the partition's console, and access the BCH Main menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

When accessing the partition's BCH interface, if you are not at the BCH Main menu then enter MA to return to the Main menu.

**Step 2.** Choose which device you wish to boot.

From the BCH Main menu, use the PATH command to list any boot path variable settings. The primary (PRI) boot path normally is set to the

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main boot device for the partition. You also can use the SEARCH command to find and list potentially bootable devices for the partition.

```
Main Menu: Enter command or menu > PATH

     Primary Boot Path:  0/0/2/0/0.13
                         0/0/2/0/0.d    (hex)

HA Alternate Boot Path:  0/0/2/0/0.14
                         0/0/2/0/0.e    (hex)

   Alternate Boot Path:  0/0/2/0/0.0
                         0/0/2/0/0.0    (hex)

Main Menu: Enter command or menu >
```

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**Step 3.** Boot the device using the BCH interface's **BOOT** command.

You can issue the BOOT command in any of the following ways:

- **BOOT**

  Issuing the BOOT command with no arguments boots the device at the primary (PRI) boot path.

- **BOOT** *bootvariable*

  This command boots the device indicated by the specified boot path, where *bootvariable* is the PRI, HAA, or ALT boot path.

  For example, BOOT PRI boots the primary boot path.

- **BOOT LAN INSTALL** or **BOOT LAN.***ip-address* **INSTALL**

  The BOOT... INSTALL commands boot HP-UX from the default HP-UX install server or from the server specified by *ip-address*.

- **BOOT** *path*

  This command boots the device at the specified *path*.

  You can specify the *path* in HP-UX hardware path notation (for example, 0/0/2/0/0.13) or in "path label" format (for example, P0 or P1) .

  If you specify the *path* in "path label" format then *path* refers to a device path reported by the last SEARCH command.

After you issue the BOOT command, the BCH interface prompts you to specify whether you want to stop that the ISL prompt.

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To boot the /stand/vmunix HP-UX kernel from the device *without stopping at the ISL prompt*, enter **n** to automatically proceed past ISL. In most situations you will boot /stand/vmunix and not need to stop at ISL.

```
Main Menu: Enter command or menu > BOOT PRI

     Primary Boot Path:  0/0/1/0/0.15


 Do you wish to stop at the ISL prompt prior to booting? (y/n) >> n
```

```
ISL booting  hpux

Boot
: disk(0/0/1/0/0.15.0.0.0.0.0;0)/stand/vmunix
```

To boot an HP-UX kernel other than /stand/vmunix, or to boot HP-UX in single-user or LVM-maintenance mode, stop at the ISL prompt and specify the appropriate arguments to the hpux loader.

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# Booting an nPartition to the ISL Prompt

When you issue the BCH interface's BOOT command you can stop an nPartition's booting at the Initial System Loader (ISL) interface in order to interact with the ISL prompt.

To exit ISL and return to the BCH interface, enter the EXIT command at the ISL prompt. For help enter HELP at the ISL prompt.

Normally you will not need to access ISL unless you need to use the Secondary System Loader (hpux).

For details about ISL, see the *isl* (1M) manpage. Details on the Secondary System Loader (hpux) are in the *hpux* (1M) manpage.

**NOTE**

On HP nPartition servers many of the ISL commands *are not supported*. For example, AUTOBOOT, AUTOSEARCH, and PRIMPATH are not supported at ISL.

These and other features are instead supported on HP nPartition servers by each partition's BCH interface.

**BCH**

This procedure (BCH BOOT command, and reply **y** to "stop at the ISL prompt") boots a partition to the ISL prompt.

**Step 1.** Log in to the server complex's service processor (GSP or MP), access the partition's console, and access the BCH interface.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

If an nPartition is configured to automatically boot HP-UX, you must interrupt the boot process before HP-UX boots, then manually boot HP-UX using the BOOT command (in the next step) to access the ISL interface on the partition.

**Step 2.** Boot the desired device using the BCH interface's **BOOT** command, and specify that the partition stop at the ISL prompt prior to booting (reply **y** to the "stop at the ISL prompt" question).

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The EXIT command exits ISL and returns to the partition BCH interface, and the HELP command lists all available ISL interface commands.

```
Main Menu: Enter command or menu > BOOT 0/0/2/0/0.13

 BCH Directed Boot Path: 0/0/2/0/0.13

 Do you wish to stop at the ISL prompt prior to booting? (y/n) >> y

Initializing boot Device.

ISL Revision A.00.42  JUN 19, 1999

ISL>
```

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# Booting HP-UX in Single-User or LVM-Maintenance Mode

On an nPartition you can boot HP-UX in single-user mode or LVM-maintenance mode by specifying options to the Secondary System Loader (hpux).

From the nPartition's console, use the BCH interface to boot the desired device and stop at the Initial System Loader (ISL) interface, then use the Secondary System Loader (hpux) to specify the options for booting HP-UX in the desired mode.

See the *hpux* (1M) manpage for details on using the Secondary System Loader (hpux).

**BCH, ISL, and hpux**

This procedure (BCH **BOOT** command, stop at ISL interface, use hpux loader with options) boots HP-UX in single-user mode or LVM-maintenance mode on an nPartition.

**Step 1.** Log in to the server complex's service processor (GSP or MP), access the partition's console, and access the BCH interface.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

**Step 2.** Boot the desired device using the BCH interface's **BOOT** command, and specify that the partition stop at the ISL prompt prior to booting (reply **y** to the "stop at the ISL prompt" question).

```
Main Menu: Enter command or menu > BOOT 0/0/2/0/0.13

 BCH Directed Boot Path: 0/0/2/0/0.13

 Do you wish to stop at the ISL prompt prior to booting? (y/n) >> y

Initializing boot Device.

ISL Revision A.00.42  JUN 19, 1999

ISL>
```

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**Step 3.** From the ISL prompt, issue the appropriate Secondary System Loader (hpux) command to boot the HP-UX kernel in the desired mode.

Use the hpux loader to specify the boot mode options and to specify which kernel (such as: /stand/vmunix) to boot on the nPartition.

- To boot HP-UX in single-user mode:

  **hpux boot -is /stand/vmunix**

- To boot HP-UX in LVM-maintenance mode:

  **hpux boot -lm /stand/vmunix**

- To boot HP-UX at the default run level:

  **hpux boot /stand/vmunix**.

To exit the ISL prompt and return to the BCH interface, issue the EXIT command instead of specifying one of the above hpux loader commands.

```
ISL Revision A.00.42  JUN 19, 1999

ISL> hpux -is /stand/vmunix

Boot
: disk(0/0/2/0/0.13.0.0.0.0.0;0)/stand/vmunix
8241152 + 1736704 + 1402336 start 0x21a0e8


INIT: Overriding default level with level 's'

INIT: SINGLE USER MODE

INIT: Running /sbin/sh
#
```

See the *hpux* (1M) manpage for a detailed list of hpux loader options.

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# Booting from an HP-UX Installation Source

You can boot an nPartition from an HP-UX installation source—such as an install CD or an Ignite server—by specifying the install source using the BCH interface's BOOT command.

This allows you to install HP-UX on any of the nPartition's eligible devices.

**NOTE**

For instructions on installing HP-UX on your boot disk, see the installation and update guide (*HP-UX 11i Installation and Update Guide*) supplied with the HP-UX operating environment media.

**BCH**

This procedure boots an HP-UX install source on an nPartition using the partition's BCH interface.

**Step 1.** Log in to the server complex's service processor (GSP or MP), access the partition's console, and access the BCH interface.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

**Step 2.** Select the HP-UX install source that you wish to boot.

From the BCH main menu, you can boot from an Ignite server or install CD-ROM in order to install HP-UX.

You can use the SEARCH command to find and list potentially bootable devices for the partition, including any DVD-ROM devices that may have CD-ROM install media. The ALT boot path also might be set to the DVD-ROM device's path.

**Step 3.** Boot the install source using the BCH interface's **BOOT** command.

Specify the device path where the install media resides or specify the install server.

For details on booting, refer to the "Booting HP-UX on an nPartition" section.

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# Shutting Down HP-UX on an nPartition

When HP-UX is running on an nPartition, you can shut down HP-UX using either the `shutdown` command or the `reset` command.

**NOTE**

The `reboot` command does not invoke the shutdown scripts associated with subsystems. The `shutdown` command invokes the scripts and terminates all running processes in an orderly and cautious manner.

On nPartitions you have the following options when shutting down HP-UX:

- Shut down HP-UX and reboot the nPartition (`shutdown -r`).
- Shut down HP-UX and halt the nPartition (`shutdown -h`).
- Perform a **reboot for reconfig** of the nPartition (`shutdown -R`).
- Hold the nPartition at a **ready for reconfig** state (`shutdown -R -H`).

For details see the *shutdown* (1M) manpage.

**HP-UX**

This procedure shuts down HP-UX on a partition.

**Step 1.** Log in to HP-UX running on the partition.

You can log in to HP-UX on the partition either by directly connecting (with the `telnet` or `rlogin` commands) or by logging in to its complex's service processor (GSP or MP) and using the Console menu to access the partition's console.

Accessing the console through the service processor allows you to maintain console access to the nPartition after HP-UX has shut down.

**Step 2.** Issue the **`shutdown`** command with the appropriate command-line options.

The command-line options you specify dictate the way in which HP-UX is shut down, whether the partition is rebooted, and whether any partition configuration changes (adding or removing cells) take place.

Use the following list to choose an HP-UX shut down option for your nPartition.

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- **Shut down HP-UX and halt the partition.**

  Issue the **`shutdown -h`** command to shut down and halt the partition.

  This leaves the partition and all its cells in an *active* state (the partition cannot be reconfigured) after HP-UX shuts down and halts.

  To reboot the partition you must reset the partition using the GSP command menu's `RS` command.

- **Shut down HP-UX and reboot the partition.**

  Issue the **`shutdown -r`** command to shut down and reboot the partition.

- **Perform a *reboot for reconfig* of the partition.**

  Issue the **`shutdown -R`** command to perform a reboot for reconfig.

  This shuts down HP-UX, reconfigures the partition if needed, and reboots the partition.

- **Reboot the partition and put it in to a *ready for reconfig* state.**

  Use the **`shutdown -R -H`** command to hold the partition in a ready for reconfig state.

  This leaves the partition and all its cells in an *inactive* state (the partition can be reconfigured remotely).

  To reboot the partition you must do so manually by using the service processor Command menu's `BO` command.

If HP-UX is halted on the partition, thus not allowing you to use the `shutdown` command, you can reboot or reset the partition by issuing commands from the service processor Command menu.

Refer to the "Rebooting or Resetting an nPartition" section for other procedures.

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# Rebooting or Resetting an nPartition

When you perform a reboot or reset of an nPartition, all *active cells* in the partition reboot and return to BCH or HP-UX. Any *inactive* cells in the nPartition are not rebooted in this procedure.

You can reset and reboot an nPartition by using these methods:

- *Service Processor (GSP or MP)* on page 163

  *This procedure (service processor Command menu RS command) resets an nPartition using the service processor.*

- *BCH* on page 164

  *This procedure (BCH interface REBOOT command) resets an nPartition using the partition's BCH interface.*

- *HP-UX* on page 164

  *This procedure (shutdown -r command) resets an nPartition from HP-UX running on the partition.*

**NOTE** If possible you should down HP-UX before resetting an nPartition.

HP's nPartition servers also support other types of nPartition resetting. Refer to the following sections for details on these other partition reset methods:

- "Shutting Down HP-UX on an nPartition"
- "Performing a Reboot for Reconfig for an nPartition"
- "Holding an nPartition at a Ready for Reconfig State"
- "Performing a Transfer-of-Control (TOC) Reset of a Partition"

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### Service Processor (GSP or MP)

This procedure (service processor Command menu **RS** command) resets an nPartition using the service processor.

**Step 1.** Log in to the server complex's service processor (GSP or MP) and access the Command menu.

After logging in to the service processor, enter **CM** to select the Command menu.

```
GSP login: Accountname
GSP password:

GSP> CM

       Enter HE to get a list of available commands

GSP:CM>
```

**Step 2.** At the Command menu, enter the **RS** command, specify which nPartition is to be reset, and confirm whether to reset it.

The Command menu's RS command resets all *active cells* in the nPartition and reboots them past partition rendezvous to BCH or HP-UX.

*Be certain to correctly select which nPartition to be reset.*

```
GSP:CM> RS

This command resets the selected partition.

WARNING: Execution of this command irrecoverably halts all system
         processing and I/O activity and restarts the selected
         partition.


     #    Name
    ---   ----
     0)   jules00
     1)   jules01

    Select a partition number: 1

    Do you want to reset partition number 1? (Y/[N]) y

    -> The selected partition will be reset.
GSP:CM>
```

If you are accessing the service processor using a single-partition-user account, the RS command selects which nPartition is to be reset: the partition that your account allows you to access.

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If using an operator or administrator service processor account, you can select which of the server complex's nPartitions you want to reset.

**BCH**

This procedure (BCH interface **REBOOT** command) resets an nPartition using the partition's BCH interface.

**Step 1.** Log in to the server complex's service processor, access the nPartition's console, and access the BCH Main menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

**Step 2.** From the partition's BCH main menu, enter the **REBOOT** command to reboot the partition.

The BCH interface's `REBOOT` command resets all *active cells* in the partition and reboots them past partition rendezvous to BCH or HP-UX.

```
---- Main Menu -------------------------------------------------------------

     Command                              Description
     -------                              -----------
     BOot [PRI|HAA|ALT|<path>]            Boot from specified path
     PAth [PRI|HAA|ALT] [<path>]          Display or modify a path

     REBOOT                               Restart Partition
     RECONFIGRESET                        Reset to allow Reconfig Complex Profile
----
Main Menu: Enter command or menu > REBOOT
Rebooting the partition ...
```

**HP-UX**

This procedure (**`shutdown -r`** command) resets an nPartition from HP-UX running on the partition.

**Step 1.** Log in to HP-UX running on the nPartition you want to reset.

You can log in to HP-UX on the partition either by directly connecting (with the `telnet` or `rlogin` commands) or by logging in to its complex's service processor (GSP or MP) and using the Console menu to access the partition's console.

**Step 2.** Issue the **`shutdown -r`** command to reset the nPartition.

The `shutdown -r` command shuts down HP-UX and reboots the partition. All *active cells* in the nPartition are reset.

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# Performing a Reboot for Reconfig for an nPartition

During a **reboot for reconfig** of a partition, the HP-UX command that you issue (`shutdown -R`) performs the following tasks:

1. Shuts down HP-UX and resets all cells that are assigned to the partition, including any inactive cells.
2. Reconfigures the partition if necessary (adds or removes cells).
3. Boots all cells in the partition. Any cells with a "n" use-on-next-boot value remain inactive at BIB, and all other cells can rendezvous to form the partition.

You should perform a reboot for reconfig of a partition whenever you add or remove cells from the partition, and whenever you need to allow an inactive cell to join the partition (such as after changing a cell's use-on-next-boot value from "n" to "y").

**HP-UX**

This procedure (**`shutdown -R`** command) performs a reboot for reconfig for an nPartition.

**Step 1.** Log in to HP-UX running on the nPartition.

You can log in to HP-UX on the partition either by directly connecting (with the `telnet` or `rlogin` commands) or by logging in to its complex's service processor (GSP or MP) and using the Console menu to access the partition's console.

**Step 2.** Issue the **`shutdown -R`** command to perform a reboot for reconfig of the partition.

The `shutdown -R` command shuts down HP-UX, reboot all cells assigned to the nPartition, performs any partition reconfigurations, and boot all cells that have "y" use-on-next-boot values.

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# Holding a Partition at a Ready for Reconfig State

Resetting an nPartition to a **ready for reconfig** state performs any changes to the partition's configuration and holds the partition and all its cells in a boot-is-blocked (*inactive*) state.

To boot a partition after you have reset it to a ready for reconfig state, you must use the service processor (GSP or MP) Command menu's `BO` command.

You can hold an nPartition at a ready for reconfig state by using the following methods:

- *Service Processor (GSP or MP)* on page 167

  *This procedure (Command menu RR command) resets an nPartition to a ready for reconfig state from the service processor.*

- *BCH* on page 168

  *This procedure (RECONFIGRESET command) resets an nPartition to a ready for reconfig state from the partition's BCH interface.*

- *HP-UX* on page 168

  *This procedure (shutdown -R -H command) resets an nPartition to a ready for reconfig state from HP-UX running on the partition.*

When you use the above methods to hold an nPartition at a ready for reconfig state, the commands perform the following tasks:

1. Shut down HP-UX (if using the `shutdown -R -H` command) and reset all cells that are assigned to the partition, including any inactive cells.
2. Reconfigures the partition if necessary (adds or removes cells).
3. Keeps all cells at a boot-is-blocked state; the partition and all cells assigned to it are inactive.

You should reset an nPartition to ready for reconfig whenever you need for the partition and its cells to be inactive. This enables you to modify the partition's configuration from the GSP or from HP-UX running on a remote partition in the same system complex.

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**Service Processor (GSP or MP)**

This procedure (Command menu **RR** command) resets an nPartition to a ready for reconfig state from the service processor.

**Step 1.** Log in to the server complex's service processor and enter **CM** to access the Command menu.

```
GSP> CM

            Enter HE to get a list of available commands

GSP:CM>
```

**Step 2.** At the service processor Command menu, enter the **RR** command, specify which nPartition is to be reset, and confirm whether to reset it to a ready for reconfig state.

The service processor's RR command resets all cells in the partition, performs any partition reconfigurations, and halts all cells at a boot-is-blocked state, thus making the partition and all its cells inactive.

*Be certain to correctly select the nPartition to be reset.*

```
GSP:CM> RR

This command resets for reconfiguration the selected partition.

WARNING: Execution of this command irrecoverably halts all system
         processing and I/O activity and restarts the selected
         partition in a way that it can be reconfigured.


     #    Name
    ---   ----
     0)   jules00
     1)   jules01

    Select a partition number: 1

    Do you want to reset for reconfiguration partition number 1? (Y/[N]) y

    -> The selected partition will be reset for reconfiguration.
GSP:CM>
```

If you are accessing the service processor using a single-partition-user account, the RR command selects which partition is to be reset: the partition that your account allows you to access.

If using an operator or administrator GSP account, you can select which of the server complex's partitions you want to reset.

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**BCH**

This procedure (**RECONFIGRESET** command) resets an nPartition to a ready for reconfig state from the partition's BCH interface.

**Step 1.** Log in to the server complex's service processor, access the nPartition's console, and access the BCH interface.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

**Step 2.** From the partition's BCH interface, enter the **RECONFIGRESET** command to reset the partition to a ready for reconfig state.

The RECONFIGRESET command resets all cells in the partition, performs any partition reconfigurations, and halts all cells at a boot-is-blocked state, thus making the partition and all its cells inactive.

```
---- Main Menu -------------------------------------------------------------

     Command                              Description
     -------                              -----------
     BOot [PRI|HAA|ALT|<path>]            Boot from specified path
     PAth [PRI|HAA|ALT] [<path>]          Display or modify a path

     REBOOT                               Restart Partition
     RECONFIGRESET                        Reset to allow Reconfig Complex Profile
----
Main Menu: Enter command or menu > RECONFIGRESET
Reset the partition for reconfiguration of Complex Profile ...
```

**HP-UX**

This procedure (**shutdown -R -H** command) resets an nPartition to a ready for reconfig state from HP-UX running on the partition.

**Step 1.** Log in to HP-UX running on the nPartition.

You can log in to HP-UX on the partition either by directly connecting (with the telnet or rlogin commands) or by logging in to its complex's service processor (GSP or MP) and using the Console menu to access the partition's console.

**Step 2.** Issue the **shutdown -R -H** command to reset the partition to a ready for reconfig state.

The shutdown -R -H command shuts down HP-UX, reset all cells in the partition, perform any partition reconfigurations, and halt all cells at a boot-is-blocked state, thus making the partition and all its cells inactive.

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# Performing a Transfer-of-Control (TOC) Reset of a nPartition

You can use the service processor Command menu's TC command to perform a transfer-of-control (TOC) reset of an nPartition.

If crash dump is configured for HP-UX on the nPartition, when you TOC the partition while it is running HP-UX the partition performs a crash dump and gives you an opportunity select the type of dump.

**Service Processor (GSP or MP)**

This procedure (Command menu **TC** command) to perform a transfer-of-control (TOC) reset of an nPartition.

**Step 1.** Log in to the server complex's service processor and enter **CM** to access the Command menu.

```
GSP> CM

               Enter HE to get a list of available commands

GSP:CM>
```

**Step 2.** At the Command menu, enter the **TC** command, specify which nPartition is to be reset, and confirm whether to TOC the partition.

The TC command performs a transfer-of-control reset on the specified nPartition.

If you are accessing the service processor using a single-partition-user account, the TC command selects which partition is to be reset: the partition that your account allows you to access.

If using an operator or administrator account, you can select which of the server complex's partitions you want to TOC.

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*Be certain to correctly select the nPartition to be reset.*

```
GSP:CM> TC

This command TOCs the selected partition.

WARNING: Execution of this command irrecoverably halts all system
         processing and I/O activity and restarts the selected
         partition.


     #   Name
    ---  ----
     0)  jules00
     1)  jules01

Select a partition number: 0

    Do you want to TOC partition number 0? (Y/[N]) y

    -> The selected partition will be TOCed.
GSP:CM>
```

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**Step 3.** After you initiate the TOC, you can observe its progress and select the type of crash dump through the nPartition's console.

Once the partition completes the dump, or once you cancel it, the partition reboots.

```
       ******* Unexpected TOC. Processor HPA FFFFFFFF'FC07C000 *******
                                GENERAL REGISTERS:
r00/03 00000000'00000000 00000000'0099CA2C 00000000'00000000 00000000'010BB790
r04/07 00000000'00000002 00000000'010BC140 00000000'0080F000 00000000'00AA2490
r08/11 00000000'00000001 00000000'0099A800 00000000'0099A800 00000000'0099C800

Processor 8 TOC:  pcsq.pcoq = 0'0.0'12675c
                  isr.ior   = 0'10340004.0'2f8bfd30

Boot device reset done.
*** The dump will be a SELECTIVE dump:  457 of 4080 megabytes.
*** To change this dump type, press any key within 10 seconds.
*** Proceeding with selective dump.

*** The dump may be aborted at any time by pressing ESC.
*** Dumping:   7% complete (32 of 457 MB) (device 64:0x2)
```

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# Booting an Inactive nPartition Past Boot-Is-Blocked (BIB)

When all cells in an nPartition are at boot-is-blocked, the partition is *inactive*. This is the case, for example, when an nPartition is held at a ready for reconfig state.

You can boot an nPartition past the ready for reconfig state to make it active by using the service processor Command menu's `BO` (boot) command.

To determine whether a partition is in a boot-is-blocked (ready for reconfig) state, use the partition's Virtual Front Panel to monitor the partition's boot activity. If all of the partition's cells are at boot-is-blocked, the partition is halted at a ready for reconfig state.

### Service Processor (GSP or MP)

This procedure (Command menu **`BO`** command) boots an nPartition past the ready for reconfig state to make the partition active.

If you use the Command menu's `BO` command to attempt to boot a partition that already is active, the command has no effect.

**Step 1.** Log in to the server complex's service processor and enter **`CM`** to select the Command menu.

```
# telnet sdome-s
Trying...
Connected to sdome-s.rsn.hp.com.
Escape character is '^]'.
Local flow control off

GSP login: Accountname
GSP password:


        CO: Consoles
       VFP: Virtual Front Panel
        CM: Command Menu
        CL: Console Logs
        SL: Show chassis Logs
        HE: Help
         X: Exit Connection

GSP> CM

               Enter HE to get a list of available commands


GSP:CM>
```

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**Step 2.** From the Command menu, enter the **BO** command and specify which nPartition is to be booted (released from boot-is-blocked).

As a result of the BO command, the complex's service processor releases the selected partition's cells from boot-is-blocked: the cells proceed to rendezvous to form and active partition, which no longer is in a ready for reconfig state.

```
GSP:CM> BO

This command boots the selected partition.


     #   Name
    ---  ----
     0)  jules00
     1)  jules01

    Select a partition number: 0

    Do you want to boot partition number 0? (Y/[N]) y

    -> The selected partition will be booted.
GSP:CM>
```

Any of the partition's cells that are not configured (those with a "n" use-on-next-boot value) remain inactive at boot-is-blocked.

When the partition becomes active it proceeds through the normal boot process and performs, as necessary, the boot action set for each of the boot paths (PRI, HAA, ALT).

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# Listing nPartition Boot Settings

You can list an nPartition's boot-related settings by using the partition's BCH interface or by using HP-UX commands.

To *list boot settings* for nPartitions you can use the following methods:

- *BCH* on page 173

  *This procedure (Main menu, Information menu, and Configuration menu BCH commands) lists a partition's boot settings using the BCH interface.*

- *HP-UX* on page 176

  *This procedure (parstatus -V -p# and setboot commands) lists an nPartition's boot settings using HP-UX commands.*

- *Partition Manager* on page 178

  *This procedure (Partition —> Show Partition Details action, General tab) lists an nPartition's boot paths from Partition Manager.*

Also refer to the following sections for details on *configuring boot settings* for nPartitions.

- "Configuring Boot Paths for a Partition"
- "Configuring Boot Actions for Partition Boot Paths"
- "Configuring Auto Start for a Partition"
- "Configuring Fast Boot Settings for a Partition"
- "Configuring the Boot Timer for a Partition"
- "Deconfiguring Cells, Processors, and Memory"

**BCH**

This procedure (Main menu, Information menu, and Configuration menu BCH commands) lists a partition's boot settings using the BCH interface.

**Step 1.** Log in to the server complex's service processor (GSP or MP), access the partition's console, and access the BCH Main menu.

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From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

**Step 2.** Access the BCH menu that provides the information you want to list.

The BCH interface's *Main menu*, the *Information menu*, and the *Configuration menu* provide commands for listing (and setting) boot options for the partition.

Use the following list to determine which BCH menu and command provides the boot information that interests you.

- **BCH Main menu**

  If you are at one of the other BCH menus, enter **MA** to return to the BCH interface's Main menu.

**Table 5-1 BCH Main Menu Boot Settings**

| | |
|---|---|
| PATH | Displays or sets the boot paths: primary (PRI), high-availability (HAA), and alternate (ALT). |

- **BCH Configuration menu**

  From the BCH main menu, enter **CO** to access the Configuration menu.

**Table 5-2 BCH Configuration Menu Boot Settings**

| | |
|---|---|
| AU | *Supported on HP Superdome servers only.*<br>Displays or sets the auto-start flag, which determines whether the boot process proceeds following a self-test failure. |
| BOOTTIMER | Displays or sets the time allowed for booting. |
| CELLCONFIG | Displays or sets the (de)configuration of cells. |
| CORECELL | Displays or sets the core cell choices. |
| FASTBOOT | Displays or specifies whether certain self-tests are run during the boot process. |
| PATHFLAGS | Displays or sets the boot action for each boot path. |

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- **BCH Information menu**

  From the BCH Main menu, enter **IN** to access the Information menu.

**Table 5-3 BCH Information Menu Boot Settings**

| | |
|---|---|
| BOOTINFO | Displays boot configuration information. |

**Step 3.** At the appropriate BCH menu issue the command to display the boot information of interest to you.

See the list in the previous step for commands and menus. Enter the command *with no arguments* to display (but not change) the boot setting.

The following example shows using the PATH command to list the partition's boot paths, then accessing the BCH Configuration menu and issuing the PATHFLAGS command to list the partition's boot action settings for the PRI, HAA, and ALT boot paths.

```
Main Menu: Enter command or menu > PATH

     Primary Boot Path:  4/0/2/0/0.10
                         4/0/2/0/0.a    (hex)

HA Alternate Boot Path:  4/0/1/0/0.6
                         4/0/1/0/0.6    (hex)

   Alternate Boot Path:  4/0/1/0/0.5
                         4/0/1/0/0.5    (hex)

Main Menu: Enter command or menu > CO

---- Configuration Menu -------------------------------------------------

     Command                           Description
     -------                           -----------
     AUtostart [ON|OFF]                Display or set the auto start flag
     BootID [<cell>[<proc>[<bootid>]]] Display or set Boot Identifier
     BootTimer [0-200]                 Seconds allowed for boot attempt

Configuration Menu: Enter command > PATHFLAGS

     Primary Boot Path Action
          Boot Actions:  Boot from this path.
                         If unsuccessful, go to next path.

HA Alternate Boot Path Action
          Boot Actions:  Boot from this path.
                         If unsuccessful, go to BCH.

   Alternate Boot Path Action
          Boot Actions:  Skip this path.
                         Go to BCH.

Configuration Menu: Enter command >
```

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**HP-UX**

This procedure (**`parstatus -V -p#`** and **`setboot`** commands) lists an nPartition's boot settings using HP-UX commands.

**NOTE**

Use the `parstatus` command to list various partition boot settings for *any* nPartition in a server complex.

The `setboot` command only provides information about the *local partition's* PRI and ALT boot paths and PRI boot actions.

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**Step 1.** Log in to HP-UX running on an nPartition.

If you want to list autoboot settings for an nPartition, you must log in to the partition. To list other details, such as boot paths and core cell settings, you can log in to any nPartition.

**Step 2.** Issue the **`parstatus -V -p#`** command to list detailed information about the specified nPartition (`-p#`), including boot-related details.

The boot setting information that `parstatus -V -p#` reports is equivalent to the following BCH commands: `PATH`, `CELLCONFIG`, and `CORECELL`.

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The following example lists detailed information for partition number 0, including the partition's boot path settings, its core cell information, and its cells' use-on-next-boot settings.

```
# parstatus -V -p0
[Partition]
Partition Number       : 0
Partition Name         : jules00
Status                 : active
IP address             : 0.0.0.0
Primary Boot Path      : 0/0/2/0/0.13.0
Alternate Boot Path    : 0/0/2/0/0.0.0
HA Alternate Boot Path : 0/0/2/0/0.14.0
PDC Revision           : 6.0
IODCH Version          : 23664
CPU Speed              : 552 MHz
Core Cell              : cab0,cell0
Core Cell Alternate [1]: cab0,cell0
Core Cell Alternate [2]: cab0,cell2

[Cell]
                        CPU     Memory                                  Use
                        OK/     (GB)                            Core    On
Hardware    Actual      Deconf/ OK/                             Cell    Next Par
Location    Usage       Max     Deconf    Connected To          Capable Boot Num
==========  ==========  ======= ========= ==================    ======= ==== ===
cab0,cell0 active core  4/0/4    2.0/ 0.0 cab0,bay0,chassis1  yes     yes  0
cab0,cell2 active base  4/0/4    2.0/ 0.0 cab0,bay1,chassis3  yes     yes  0

[Chassis]
                                Core Connected  Par
Hardware Location   Usage       IO   To         Num
==================  ==========  ==== ========== ===
cab0,bay0,chassis1  active      yes  cab0,cell0 0
cab0,bay1,chassis3  active      yes  cab0,cell2 0

#
```

As the above example shows, the primary (PRI) boot path is 0/0/2/0/0.13.0, the active core cell is cell 0, and the core cell choices are cell 0 (first preference) and cell 2 (second preference). Both of the partition's cells are set to be used ("yes") the next time the partition boots. Both cells are actively used ("active core" and "active base").

**Step 3.** Issue the **`setboot`** command to list the *local nPartition's* PRI and ALT (but not HAA) boot paths, and to list the boot actions for the PRI boot path.

```
# setboot
Primary bootpath : 0/0/2/0/0.13.0
Alternate bootpath : 0/0/2/0/0.0.0

Autoboot is ON (enabled)
Autosearch is OFF (disabled)

Note: The interpretation of Autoboot and Autosearch has changed for
systems that support hardware partitions. Please refer to the manpage.
#
```

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The setboot command reports the local partition's PRI and ALT boot path values, but does not list the HAA boot path.

The `setboot` command also reports the "autoboot" and "autosearch" settings for the PRI boot path. Combined, these two settings are equivalent to the PRI path's boot actions (its "path flags" setting).

When autoboot is set to ON, the nPartition attempts to automatically boot from the PRI boot path when it first boots to BCH. Otherwise, when autoboot is OFF, the partition remains at the BCH interface on startup.

When autosearch is set to ON, the partition will attempt to perform the boot action for the HAA boot path if the PRI boot action is automatically attempted and fails to boot (when autoboot is ON). When autosearch is set to OFF, the partition remains at BCH if the PRI path is not automatically booted on startup.

Refer to the "Configuring Autoboot and Autostart for a Partition" section for other details.

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**Partition Manager**

This procedure (**Partition —> Show Partition Details** action, **General** tab) lists an nPartition's boot paths from Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** Select the partition whose boot path settings you want to view.

Partitions are listed on the left side of the Partition Manager primary window.

**Step 3.** Select the **Partition —> Show Partition Details** action and view the boot path settings in the **General** tab.

This displays the PRI, HAA, and ALT boot path values for the selected nPartition.

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# Configuring Boot Paths and Boot Actions

You can configure each nPartition's boot *paths* (device paths for booting HP-UX) and boot *actions* (preferred automatic boot behavior) by using the following methods:

- *BCH* on page 181

  *This procedure (BCH Main menu PATH command, and Configuration menu PATHFLAGS command) configures an nPartition's boot paths and boot actions (path flags) through its BCH interface.*

- *HP-UX Commands* on page 182

  *This procedure (parmodify -p#... and setboot... commands) sets nPartition boot path variables from HP-UX and enables you to check and set the local partition's PRI boot action (the PRI path flag).*

By configuring boot paths and boot actions for an nPartition, you can set the partition to automatically boot from a primary source or, if the primary source fails, from backup devices.

Each nPartition's **boot device paths** list the hardware paths of devices for booting HP-UX on the nPartition.

The boot paths are:

- PRI—Primary boot path.
- HAA—High-availability alternate boot path, typically a mirror of the primary root volume.
- ALT—Alternate boot path. Typically used for install or recovery media (such as DAT or CD-ROM drive).

Each nPartition also has a set of **boot actions (path flags)**, which specify the *default actions to be automatically performed* when the partition boots to the BCH interface. Each of the three boot paths (PRI, HAA, and ALT) has its own path flag setting that defines its boot action.

The order in which an nPartition's boot actions are attempted is: PRI boot action, then HAA boot action (if necessary), and finally ALT boot action (if necessary).

The boot actions (path flag settings) for each boot path are:

- 0—Go to BCH.

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- 1—Boot this path, if fail go to BCH.
- 2—Boot this path, if fail attempt to perform the next path's boot action.
- 3—Skip this path, attempt to perform the next path's boot action.

By default, all path flags are set to 0 ("Go to BCH").

The boot actions are performed *automatically* by the BCH interface when an nPartition boots to BCH, as possible and necessary. However, boot action settings *do not* affect the behavior of the BCH `BOOT` command.

### Setting Autoboot through Boot Paths and Boot Actions

Each nPartition's **Autoboot setting** is established by the boot action (path flag) settings for the partition's boot paths.

For an nPartition to *automatically boot HP-UX* it must be configured in the following way:

- The nPartition must have at least one bootable HP-UX device that is pointed to by the PRI, HAA, or ALT boot path variable.
- The path flag (boot action) setting for a bootable device's path variable must be set to "boot this path" (1 or 2).
- When the partition boots it must proceed to execute a bootable device's boot action that specifies to "boot this path", and it must find the device.

For example, a partition could automatically boot HP-UX with the following configuration: both the PRI and HAA paths point to bootable devices, and the PRI action is 2 ("boot this path, if fail attempt to perform the next path's boot action") and the HAA action is 1 ("boot this path, if fail go to BCH").

In this example configuration, the partition could automatically boot HP-UX even if the PRI path were not available. When the partition boots to BCH it first attempts to boot the PRI device. If the PRI device cannot be booted, because the PRI path flag specifies to "if fail attempt to perform the next path's boot action", it then refers to the HAA path and action. Because in this example the HAA path points to a bootable device, and because the HAA path flag specifies to attempt to boot the HAA device, the partition can still automatically boot HP-UX (if the HAA device is available).

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**BCH**

This procedure (BCH Main menu **PATH** command, and Configuration menu **PATHFLAGS** command) configures an nPartition's boot paths and boot actions (path flags) through its BCH interface.

To list all boot path and action settings for an nPartition, you also can use the BCH Information menu's `BOOTINFO` command.

**Step 1.** Determine which devices will be used for booting HP-UX on the nPartition, and determine the boot behaviors you desire.

You need to determine the hardware paths of all potential boot devices that you will configure as the PRI, HAA, and ALT boot paths.

You also need to determine which device you want to boot by default (if any), and which (if any) device you want to boot if the default device fails to boot.

Typically, the PRI path is set to the default boot device and the HAA path is set to the device you want to boot if PRI fails to boot.

**Step 2.** Log in to the service processor (GSP or MP), access the nPartition's console, and access the BCH Main menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

**Step 3.** At the BCH Main menu, set the boot path values using the **PATH** command.

To list the current boot path settings, enter **PATH** with no arguments.

To set a boot path, enter **PATH** ***VAR hwpath***, where *VAR* is the boot path variable (PRI, HAA, or ALT) and *hwpath* is a boot device's hardware path.

For example, to set the PRI boot path to a new value (4/0/2/0/0.10, in this case) enter `PATH PRI 4/0/2/0/0.10`, as shown below.

```
Main Menu: Enter command or menu > PATH PRI 4/0/2/0/0.10.0

     Primary Boot Path:  4/0/2/0/0.10
                         4/0/2/0/0.a    (hex)

Main Menu: Enter command or menu >
```

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**Step 4.** Access the BCH Configuration menu by entering **CO** at the Main menu, and set the boot action for each boot path, as desired, by using the **PATHFLAGS** command.

At the BCH Configuration menu, you can list the path flags (boot actions) for all boot path variables by entering **PATHFLAGS** with no arguments.

To set the boot action for each of the boot paths, enter **PATHFLAGS *VAR action***, where *VAR* is the boot path variable (PRI, HAA, or ALT) and *action* is the boot action (0 for "go to BCH", 1 for "boot, if fail go to BCH", 2 for "boot, if fail try next path", or 3 for "skip this path, try next path").

For example, to configure an nPartition to boot from the PRI device or (if PRI fails to boot) the HAA device, use the following two BCH Configuration commands: **PATHFLAGS PRI 2** and **PATHFLAGS HAA 1**, as shown below.

```
Configuration Menu: Enter command > PATHFLAGS PRI 2

     Primary Boot Path Action
          Boot Actions:  Boot from this path.
                         If unsuccessful, go to next path.

Configuration Menu: Enter command > PATHFLAGS HAA 1

HA Alternate Boot Path Action
          Boot Actions:  Boot from this path.
                         If unsuccessful, go to BCH.

Configuration Menu: Enter command >
```

For other help in setting path flags, enter `HELP PATHFLAGS` at the BCH Configuration menu prompt.

**HP-UX Commands**

This procedure (**`parmodify -p#...`** and **`setboot...`** commands) sets nPartition boot path variables from HP-UX and enables you to check and set the local partition's PRI boot action (the PRI path flag).

**Step 1.** Determine which devices will be used for booting HP-UX on the nPartition, and determine the boot behaviors you desire for the PRI boot path.

**Step 2.** Log in to HP-UX running on an nPartition in the complex.

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You can modify the boot paths for any partition from any other partition in the complex when using the `parmodify` command.

However, when using the `setboot` command to modify the PRI and ALT paths or the PRI boot action, you can modify only the *local* partition's settings.

**Step 3.** Configure boot path settings using the **`parmodify -p#...`** command.

Use the following commands to set the boot path variables for a specified partition number (`-p#`):

- PRI path—`parmodify -p# -b` *`PRI`* where *`PRI`* is the hardware path.
- HAA path—`parmodify -p# -s` *`HAA`* where *`HAA`* is the hardware path.
- ALT path—`parmodify -p# -t` *`ALT`* where *`ALT`* is the hardware path.

If using the `setboot` command to set boot paths for the *local nPartition*, you can specify `setboot -p` *`PRI`* or `setboot -a` *`ALT`* but cannot set the HAA path variable.

You can list a partition's current boot path settings by issuing the `parstatus -V -p# | grep Path` command and specifying the partition number (`-p#`). The `setboot` command with no arguments lists the PRI and ALT settings for the local partition as well as the local partition's PRI path flags (boot actions).

For example, to set the PRI boot path to 0/0/4/0/0.8.0 and the HAA boot path to 0/0/4/0/0.9.0 for partition number 0, issue the `parmodify -p0 -b 0/0/4/0/0.8.0 -s 0/0/4/0/0.9.0` command, as shown below.

```
# parmodify -p0 -b 0/0/4/0/0.8.0 -s 0/0/4/0/0.9.0
Command succeeded.
#
```

**Step 4.** As needed, configure the PRI boot action for the *local nPartition* by using the **`setboot -b` *`Autoboot`* `-s` *`Autosearch`*** command.

The `setboot` command supports the following options for setting local partition boot actions:

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`-b` **Autoboot setting** for the local partition:

`-b on` to automatically boot the PRI path.

`-b off` to not boot PRI.

`-s` **Autosearch setting** for the local partition:

`-s on` to attempt to perform the HAA path's boot action when PRI is not booted (either when `-b` is `off`, or when PRI fails to boot when `-b` is `on`).

`-s off` to never attempt to perform the HAA action.

For example, to always stop the local partition at BCH when booting issue the `setboot -b off -s off` command.

See *Setting Autoboot through Boot Paths and Boot Actions* on page 180 or the *setboot* (1M) manpage for details.

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# Configuring Autoboot and Autostart

The **Autoboot setting** specifies whether an nPartition automatically boots HP-UX. You can configure each nPartition's Autoboot setting by modifying the partition's boot actions for its boot paths. See the *Autoboot Configuration* section.

On HP Superdome servers only, you can configure an **Autostart setting** for each nPartition to specify the partition's boot behavior when one or more self tests fails. See the *Autostart Configuration* section that follows.

## Autoboot Configuration

Each nPartition's Autoboot setting is established by a combination of its boot path variable settings and the settings for each path's boot actions (determined by its path flags).

You can use the BCH Main menu's `PATH` command and the BCH Configuration menu's `PATHFLAGS` command to set boot paths and boot actions for an nPartition. You also can use the `parmodify` and `setboot` HP-UX commands to configure some of the boot path and action settings.

Refer to the section on *Configuring Boot Paths and Boot Actions* for details on configuring these settings to enable Autoboot.

## Autostart Configuration

On HP Superdome servers only, the BCH interface's Autostart setting for each partition determines the boot behavior when one of the partition's components (processors or memory) fails self test.

By default Autostart is set to OFF, and the partition stops at the BCH interface when a processor or DIMM fails self-test.

When Autostart is ON, the partition proceeds with the normal boot process and performs the boot actions for its boot paths as necessary.

**BCH**

This procedure (BCH Configuration menu, **`AU`** command) configures Autostart for an nPartition on an HP Superdome server.

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**NOTE** This procedure applies to nPartitions on HP Superdome servers only.

**Step 1.** Log in to the Superdome complex's service processor (GSP), access the nPartition's console, and access the BCH Configuration menu.

From the nPartition console you can access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

From the BCH Main menu, enter **CO** to access the Configuration menu.

**Step 2.** From the BCH Configuration menu, use the **AU** command to list or set Autostart for the partition.

Enter **AU** with no arguments to list the Autostart setting.

Enter **AU ON** to set Autostart to ON, or **AU OFF** to set it to OFF.

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# Configuring Automatic System Restart for a nPartition

The **automatic system restart** feature on nPartition servers enables you to configure an nPartition to be automatically rebooted when HP-UX hangs on the partition.

By default automatic system restart *is disabled* for nPartitions.

To enable or disable automatic system restart use the service processor Command menu's AR command, as described in *Service Processor (GSP or MP)* on page 188.

To use the AR command you must log in to the server complex's service processor using an account that has administrator authority.

**CAUTION**

When automatic system restart is enabled for an nPartition, all cells in the partition automatically will be reset—and the partition will reboot—if HP-UX running on the partition is hung for three (3) minutes.

When HP-UX is booted on an nPartition, it indicates that it is "alive" by emitting a HEARTBEAT chassis code and an ACTIVITY_LEVEL_TIMEOUT chassis code approximately every four seconds.

The service processor manages automatic system restart for each partition through a timer that tracks the time since the partition was active. This timer is reset every time an ACTIVITY_LEVEL_TIMEOUT chassis code is emitted by HP-UX on the partition. If HP-UX does not emit this chassis code for three minutes then it emits an "Alert Level 13: System hang detected" chassis code. If the partition has automatic system restart enabled then the service processor issues a PARTITION_TIMEOUT_RESET chassis code, resets all cells assigned to the partition, and the partition reboots.

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The following output shows the chassis codes (with keywords) for an HP-UX timeout and automatic reset.

```
129  GSP   0     *13 0x591008d1a000205f 0x000065060c0f1611 PARTITION_TIMEOUT_RESET
128  HPUX 0,0,0 *13 0x78e004d41100f000 0x0000000300000009
128  HPUX 0,0,0 *13 0x58e00c000000f000 0x000065060c0f1610 07/12/2001 15:22:16
```

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### Monitoring HP-UX Activity and Chassis Logs

You can monitor whether HP-UX is active on an nPartition through the partition's Virtual Front Panel and through the Chassis Logs viewer.

- You can track a partition's HP-UX activity through its Virtual Front Panel (VFP) display, which is available through the service processor. When HP-UX has booted on a partition, the partition's VFP blinks an HP-UX heartbeat indicator based on the HEARTBEAT chassis code.
- You also can track HP-UX activity though the service processor's Chassis Logs viewer, which enables you to view live (real-time) chassis codes as well as previously recorded error and activity chassis codes.

  For example, to monitor a partition's chassis codes in real time: from the service processor Main menu select `SL` for the Chassis Logs viewer, select the live chassis logs option, then type `P` and select which nPartition's chassis codes you want to monitor (to exit to the Main menu type **^b**).

**Service Processor (GSP or MP)**

This procedure (Command menu, **AR** command) enables or disables automatic system restart for an nPartition by using the service processor Command menu.

**Step 1.** Log in to the server complex's service processor (GSP or MP) and enter **CM** to access the Command menu.

**Step 2.** Issue the service processor Command menu's **AR** command to enable or disable automatic system restart for an nPartition.

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To use the AR command you must be logged in using an account that has administrator authority.

```
GSP:CM> AR

This command modifies the automatic system restart configuration of
the selected partition.

     #    Name
    --    ----
     0)   feshd5a
     1)   feshd5b

    Select a partition number: 0

    Automatic system restart for partition 0 is currently enabled.
    Do you want to disable automatic system restart? (Y/[N]) y

    -> Automatic system restart is disabled.
GSP:CM>
```

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# Configuring Fast Boot Settings (Self Tests) for a nPartition

The **fast boot settings** for an nPartition determine which self tests the partition performs during the power on or partition boot process.

You can configure nPartition fast boot settings by enabling and disabling various self tests using these methods:

- *BCH* on page 191

  *This procedure (Configuration menu, FASTBOOT command) configures an nPartition's fast boot settings using its BCH interface.*

- *HP-UX* on page 191

  *This procedure (using the setboot command) configures an nPartition's self test configuration from HP-UX running on the partition.*

**NOTE**

HP recommends that all self tests be performed for nPartitions.

When an nPartition reboots due to a system panic, HPMC, or TOC, all self tests are performed when the partition reboots.

On HP nPartition servers you can configure the following self tests:

- **PDH tests**—Processor-dependent hardware tests that test a checksum of read-only memory.

  Can be configured from BCH and HP-UX `setboot` as "PDH".

- **Early CPU tests**—Firmware, cache, and CPU-specific tests that are performed out of firmware.

  Can be configured from BCH (as "EARLY") and HP-UX `setboot` (as "early_cpu").

- **Late CPU tests**—Firmware, cache, and CPU-specific tests that are performed out of memory and thus are faster than early CPU tests.

  Can be configured from BCH (as "LATE") and HP-UX `setboot` (as "late_cpu").

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**BCH**

This procedure (Configuration menu, FASTBOOT command) configures an nPartition's fast boot settings using its BCH interface.

**Step 1.** Log in to the server complex's service processor (GSP or MP), access the partition's console, and access the BCH Configuration menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

From the BCH Main menu, enter `CO` to access the Configuration menu.

**Step 2.** At the BCH Configuration menu use the **`FASTBOOT`** command to list or set the partition's fast boot settings.

Enter `FASTBOOT` with no arguments to display the current fast boot settings. This lists which self tests are set to be performed or skipped.

**NOTE**

HP recommends that *all self tests* be performed for all nPartitions.

To *enable all tests* for a partition, use the **`FASTBOOT RUN`** command at the partition's BCH Configuration menu.

To *disable* an individual test, enter `FASTBOOT` *`test`* `SKIP`, where *`test`* is the name of the self test ("PDH", "EARLY", or "LATE").

To *enable* an individual test, enter `FASTBOOT` *`test`* `RUN`.

For details on setting self tests, enter `HELP FASTBOOT` at the Configuration menu.

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**HP-UX**

This procedure (using the **`setboot`** command) configures an nPartition's self test configuration from HP-UX running on the partition.

**Step 1.** Log in to HP-UX running on the nPartition whose self test configuration you want to change.

From HP-UX you can configure self tests for the *local* nPartition only.

**Step 2.** Enter the **`setboot -v`** command to list the current self test configuration for the local partition.

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The self test details listed by `setboot -v` include:

TEST—The keyword names of self tests that you can enable or disable.
CURRENT—The nPartition's setting for the test in stable storage: `on` means the test is normally executed on each boot, `off` means the test is normally omitted on each boot, `partial` means some subtests normally are executed on each boot. This may differ from the NEXT BOOT settings.
SUPPORTED—Whether the server supports the test completely (`yes`), partially (`partial`), or not at all (`no`).
DEFAULT—The default setting for the test, either `on`, `off`, or `partial`.
NEXT BOOT—The nPartition's self test behavior for the *next boot only*. If these settings differ from CURRENT, then the CURRENT settings are reestablished after the next boot.

The following example shows `setboot -v` output for an nPartition.

```
# setboot -v
Primary bootpath : 0/0/6/0/0.6.0
Alternate bootpath : 0/0/1/0/0.8.0

Autoboot is OFF (disabled)
Autosearch is OFF (disabled)

Note: The interpretation of Autoboot and Autosearch has changed for
systems that support hardware partitions. Please refer to the manpage.
TEST            CURRENT         SUPPORTED       DEFAULT         NEXT BOOT
----            -------         ---------       -------         ---------
all             partial         partial         partial         partial
  SELFTESTS     on              yes             on              on
    early_cpu   on              yes             on              on
    late_cpu    on              yes             on              on
  FASTBOOT      partial         partial         partial         partial
    full_memory off             no              off             off
    PDH         on              yes             on              on
  CEC           off             no              off             off
#
```

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**Step 3.** Use the **`setboot...`** command to enable or disable boot-time self tests for the local nPartition.

You can use the following commands to configure tests:

```
setboot -t test_name=[on|off|default]
setboot -T test_name=[on|off|default]
```

*`test_name`* is the name of the self test ("PDH", "early_cpu", "late_cpu") or is "all" (for all tests).

The `setboot` command's `-t` option changes the test setting in stable storage and affects all following boots. The `-T` option changes the test setting for the next boot only.

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**NOTE**

HP recommends that *all self tests* be performed for all nPartitions.

To *enable all tests* for a partition, use the following command:
**`setboot -t all=on`**

For example, to enable the early CPU tests and PDH tests but disable the late CPU tests issue the following command:

```
setboot -t early_cpu=on -t PDH=on -t late_cpu=off
```

This changes the local nPartition's settings for these tests in its stable storage and uses these test configurations for all following boots.

After modifying an nPartition's self test configuration you can list the new settings with the `setboot -v` command.

For more details refer to the *setboot* (1M) manpage.

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# Configuring the Boot Timer for a Partition

The boot timer setting establishes the number of seconds an nPartition will wait for a boot device before timing out.

When a boot device does not respond to a boot request within the number of seconds defined by the boot timer setting, the boot is considered unsuccessful.

**BCH**

This procedure (Configuration menu, **BOOTTIMER** command) configures an nPartition's boot timer setting from its BCH interface.

**Step 1.** Log in to the server complex's service processor (GSP or MP), access the partition's console, and access the BCH Configuration menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

From the BCH Main menu, enter `CO` to access the Configuration menu.

**Step 2.** From the BCH Configuration menu, use the **BOOTTIMER** command to list or set the boot timer setting.

Enter `BOOTTIMER` with no arguments to list the current setting.

Enter `BOOTTIMER` *seconds* to set the boot timer setting to the specified (*seconds*) number of seconds.

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# 6 Procedures for Managing nPartitions

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This chapter presents the procedures for creating, configuring, and managing nPartitions on HP servers that support them.

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# Listing the Local (Current) Partition Number

Each nPartition within a server complex has a unique number assigned to it. This **partition number** identifies the nPartition in various menus, commands, and utilities. You also can specify the partition number when performing operations on an nPartition, such as adding or removing cells or resetting a partition.

You can list the local partition number by using the following methods:

- *BCH* on page 196

  *This procedure (Configuration menu, PD command) lists the local partition number from the BCH interface.*

- *HP-UX Commands* on page 197

  *This procedure (parstatus -w) lists the partition number of the local (current) partition from HP-UX.*

## BCH

This procedure (Configuration menu, **PD** command) lists the local partition number from the BCH interface.

**Step 1.** Access the Boot Console Handler (BCH) interface for the nPartition, and access the BCH Configuration menu.

Enter `CO` from the BCH Main menu to access the Configuration menu. If you are at a BCH menu other than the Main menu, enter `MA` to access the Main menu.

**Step 2.** From the BCH Configuration menu, enter the **PD** command to list the local partition's name and partition number.

```
Configuration Menu: Enter command > PD

Partition Number: 1
  Partition Name: jules01

Configuration Menu: Enter command >
```

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**HP-UX Commands** This procedure (**`parstatus -w`**) lists the partition number of the local (current) partition from HP-UX.

**Step 1.** Log in to HP-UX running on the nPartition.

**Step 2.** Issue the **`parstatus -w`** command to list the partition number for the local partition.

```
# parstatus -w
The local partition number is 0.
# parstatus -P
[Partition]
Par                 # of  # of I/O
Num Status          Cells Chassis  Core cell  Partition Name (first 30 chars)
=== ============= ===== ======== ========== ================================
 0  active            2       2     cab0,cell0 jules00
 1  active            2       2     cab0,cell4 jules01
#
```

The `parstatus -P` command lists all partitions within the server complex, including the local partition.

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# Listing All Configured nPartitions

You can configure each server complex to have multiple nPartitions, which are composed of cells in the complex.

You can list all configured nPartitions in the server complex by using the following methods:

- *Service Processor (GSP or MP)* on page 198

  *This procedure (Command menu, CP command) lists all partitions in a server complex from the complex's service processor.*

- *HP-UX Commands* on page 199

  *This procedure (parstatus -P command, and parstatus -C for details) lists information about all partitions in a server complex from HP-UX.*

- *Partition Manager* on page 201

  *This procedure (viewing the left side of Partition Manager primary window) lists all nPartitions in a server complex using Partition Manager.*

## Service Processor (GSP or MP)

This procedure (Command menu, **CP** command) lists all partitions in a server complex from the complex's service processor.

**Step 1.** Log in to the service processor for the complex and enter **CM** to access the Command menu.

```
# telnet sdome-s
Trying...
Connected to sdome-s.rsn.hp.com.
Escape character is '^]'.
Local flow control off

GSP login: Accountname
GSP password:

        CO: Consoles
       VFP: Virtual Front Panel
        CM: Command Menu
        CL: Console Logs
        SL: Show chassis Logs
        HE: Help
         X: Exit Connection

GSP> CM

               Enter HE to get a list of available commands

GSP:CM>
```

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**Step 2.** From the service processor Command menu, enter the **CP** command to list all configured partitions within the server complex.

The CP command lists each partition (by partition number) and indicates which cells from each cabinet are assigned to the partition.

In the following example the complex has two partitions: partition number 0 has cells 0 and 2, and partition number 1 has cells 4 and 6.

```
GSP:CM> CP

-------------------------------------------------------------------------------
Cabinet |   0    |   1    |   2    |   3    |   4    |   5    |   6    |   7
--------+--------+--------+--------+--------+--------+--------+--------+--------
 Slot   |01234567|01234567|01234567|01234567|01234567|01234567|01234567|01234567
--------+--------+--------+--------+--------+--------+--------+--------+--------
Part  0 |X.X.....|........|........|........|........|........|........|........
Part  1 |....X.X.|........|........|........|........|........|........|........

GSP:CM>
```

To the right of each partition number is a list of cells assigned to the partition. Assigned cells are marked with an "X". The cell's slot (0 to 7) and its cabinet number (0 or above) are listed above each cell.

You also can use the **DU** command to list *all* cells in a server complex (and other complex hardware details), including unassigned cells.

**HP-UX Commands**

This procedure (**parstatus -P** command, and **parstatus -C** for details) lists information about all partitions in a server complex from HP-UX.

From any partition in a complex, you can list details about all cells and partitions within the complex.

**Step 1.** Log in to HP-UX running on any of the server complex's partitions.

You can log in to HP-UX on the partition either by connecting with `telnet` or `rlogin`, or by logging in to its complex's service processor and accessing the partition's console.

**Step 2.** Issue the **parstatus -P** command to list brief details about all partitions in the server complex.

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The `parstatus -P` command lists all partitions and shows each partition's number and name, the number of cells assigned to it, the number of active I/O chassis, and the partition's active core cell.

```
# parstatus -P
[Partition]
Par             # of  # of I/O
Num Status      Cells Chassis  Core cell  Partition Name (first 30 chars)
=== ========== ===== ======== ========== ==============================
 0  active         2        2     cab0,cell0 jules00
 1  active         2        2     cab0,cell4 jules01
#
```

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While a partition is booting, the `parstatus` command cannot determine the partition's I/O chassis and core cell information. When this is the case `parstatus` does not count the I/O chassis and reports a question mark (?) for the core cell. When the partition has completed booting, `parstatus` reports all details.

**Step 3.** To list detailed information about all cells and partitions in the server complex, issue the **`parstatus -C`** command.

The `parstatus -C` command presents more detailed information about all cells and partitions. These details include each cell's status (active, inactive), its processor and memory configuration, its I/O chassis connections (if any), the cell's use-on-next-boot setting, and partition assignment.

```
# parstatus -C
[Cell]
                        CPU     Memory                                  Use
                        OK/     (GB)                            Core    On
Hardware    Actual      Deconf/ OK/                             Cell    Next Par
Location    Usage       Max     Deconf    Connected To          Capable Boot Num
=========== =========== ======= ========= ==================== ======= ==== ===
cab0,cell0 active core  4/0/4    2.0/ 0.0 cab0,bay0,chassis1  yes     yes  0
cab0,cell1 absent       -       -        -                    -       -    -
cab0,cell2 active base  4/0/4    2.0/ 0.0 cab0,bay1,chassis3  yes     yes  0
cab0,cell3 absent       -       -        -                    -       -    -
cab0,cell4 active core  4/0/4    2.0/ 0.0 cab0,bay0,chassis3  yes     yes  1
cab0,cell5 absent       -       -        -                    -       -    -
cab0,cell6 active base  4/0/4    2.0/ 0.0 cab0,bay1,chassis1  no      yes  1
cab0,cell7 absent       -       -        -                    -       -    -

#
```

For cells and partitions that have not finished booting, the `parstatus` command cannot determine processor, memory, or I/O details and instead reports a question mark (?) for these details.

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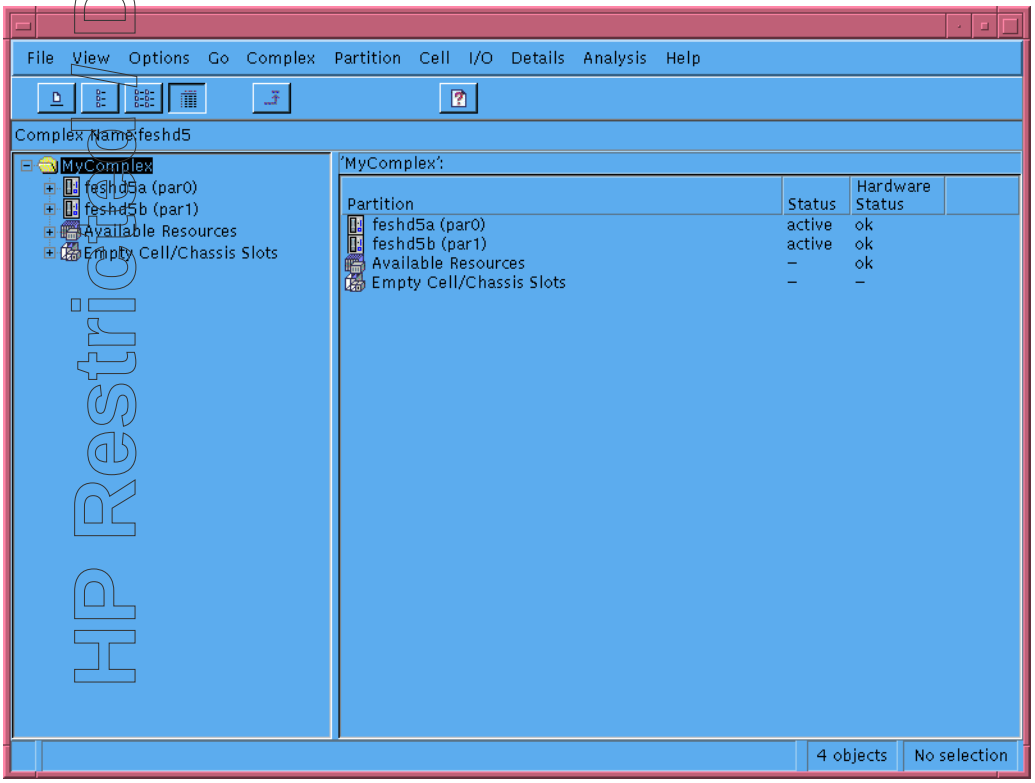
### Partition Manager

This procedure (viewing the left side of Partition Manager primary window) lists all nPartitions in a server complex using Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** When the Partition Manager starts up the left side of its primary display lists the partitions in the complex.




The right side of the primary display also lists the complex's nPartitions when nothing is selected on the display's left side, or when **My Complex** is selected.

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# Listing Cell nPartition Assignments

Each cell in an nPartition server complex either is assigned to an nPartition, or it is unassigned (if it is on the “free cell list”, making it an available resource).

You can list all cells and their nPartition assignments by using these methods:

- *Service Processor (GSP or MP)* on page 202

  *This procedure (Command menu, CP and DU commands) lists all cell partition assignments and other details from the server complex’s service processor.*

- *HP-UX* on page 203

  *This procedure (parstatus -C) lists all cells in a server complex and their partition assignments.*

- *Partition Manager* on page 203

  *This procedure (selecting each partition and Available Resources on the left side of the primary window) lets you view all cell partition assignments in a server complex from Partition Manager.*

### Service Processor (GSP or MP)

This procedure (Command menu, **CP** and **DU** commands) lists all cell partition assignments and other details from the server complex’s service processor.

**Step 1.** Log in to the service processor for the complex and enter **CM** to access the Command menu.

**Step 2.** Enter the **CP** command to list all configured nPartitions in the server complex.

**Step 3.** Enter the **DU** command to list additional details (such as available core I/O) for the cells assigned to the various nPartitions in the server complex.

On HP Superdome servers, you also can use the service processor Command menu’s **IO** command to list cell-to-I/O chassis connections.

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**HP-UX**

This procedure (**`parstatus -C`**) lists all cells in a server complex and their partition assignments.

**Step 1.** Log in to HP-UX running on one of the server complex's partitions.

**Step 2.** Issue the **`parstatus -C`** command to list all cells, any I/O chassis connections, and any partition assignments for the cells.

In addition to reporting the cell partition assignments (listed in the "Par Num" column), the `parstatus -C` command reports each cell's current status (absent, inactive, active core, active base) in the "Actual Usage" column.

```
# parstatus -C
[Cell]
                        CPU     Memory                                  Use
                        OK/     (GB)                            Core    On
Hardware    Actual      Deconf/ OK/                             Cell    Next Par
Location    Usage       Max     Deconf    Connected To          Capable Boot Num
==========  ==========  ======= ========= ==================== ======= ==== ===
cab0,cell0 active core  4/0/4    2.0/ 0.0 cab0,bay0,chassis1  yes     yes  0
cab0,cell1 absent       -       -         -                    -       -    -
cab0,cell2 active base  4/0/4    2.0/ 0.0 cab0,bay1,chassis3  yes     yes  0
cab0,cell3 absent       -       -         -                    -       -    -
cab0,cell4 active core  4/0/4    2.0/ 0.0 cab0,bay0,chassis3  yes     yes  1
cab0,cell5 absent       -       -         -                    -       -    -
cab0,cell6 inactive     4/0/4    2.0/ 0.0 cab0,bay1,chassis1  no      -    -
cab0,cell7 absent       -       -         -                    -       -    -

#
```

For cells that are not assigned to a partition, `parstatus -C` lists a hyphen (`-`) in the "Par Num" column instead of the cell's partition number. The "Connected To" column lists any I/O chassis connections for the cells, and "Core Cell Capable" lists whether core I/O is available through each the cell's I/O chassis.

**Partition Manager**

This procedure (selecting each partition and Available Resources on the left side of the primary window) lets you view all cell partition assignments in a server complex from Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** At the Partition Manager primary window, select each nPartition on the left side of the window to list the partition's cell assignments on the

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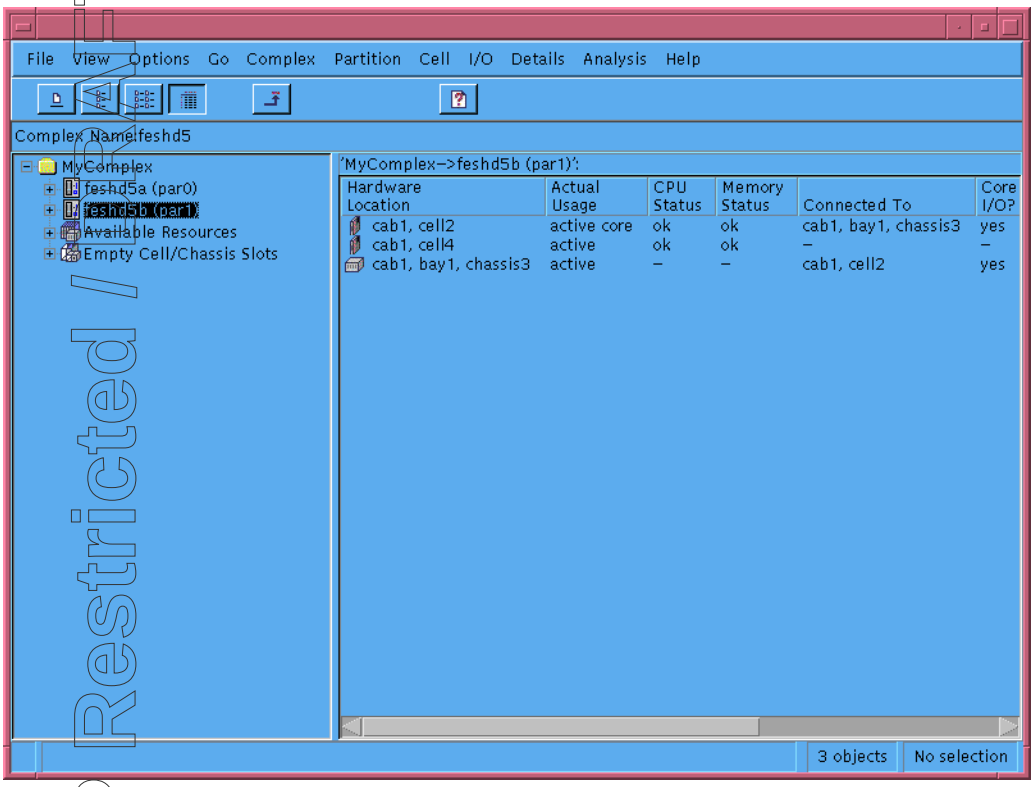
window's right side, or select Available Resources to list all unassigned cells.




On the right side of the primary window, for each selected nPartition, Partition Manager lists the cell assignments and any I/O chassis connected to the cells.

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# Creating a Genesis Partition

When you create a Genesis Partition, you establish a one-cell partition on the server complex. The Genesis Partition replaces all other partitions, and once created it is the only partition in the server.

The only way to create a Genesis Partition is to use the service processor Command menu's **CC** command on the server complex.

**Service Processor (GSP or MP)**

The following procedure (service processor Command menu, **CC** command, **G** option) creates a Genesis Partition on an HP nPartition server.

As a result of this procedure, *all existing nPartitions are destroyed* and are replaced with a single, one-cell nPartition (the Genesis Partition).

You can revert to the previous nPartition configuration—if any existed before you created the Genesis Partition—by using the CC command's L option to restore the last configuration.

**Step 1.** Save all current nPartition configuration details, if any partitions are configured in the complex.

Saving the current partition information provides you the details you would need to re-create all partitions as they currently exist.

Use the `parstatus -V -p#` HP-UX command (or an equivalent `parmgr` procedure) to save configuration details about each partition.

For each nPartition enter the `parstatus -V -p#` command to display detailed information about the partition number (`-p#`) specified.

**Step 2.** Determine which cell will be configured as the Genesis Partition.

The cell must be connected to an I/O chassis. The I/O chassis must have a core I/O card installed, and it should have a bootable HP-UX disk (or a method for installing HP-UX and a disk onto which it can be installed).

**Step 3.** Ensure that all nPartitions within the complex are in a ready for reconfig (inactive) state.

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If a partition is running HP-UX, you can shut down the partition to a ready for reconfig state by using the `shutdown -R -H` command.

Or you can put an nPartition into a ready for reconfig state by using the BCH interface's `RECONFIGRESET` command or using the service processor Command menu's `RR` command.

**Step 4.** Log in to the server complex's service processor (GSP or MP).

Log in as a user with administrator privileges, which are required for creating a Genesis Partition.

**Step 5.** Enter **`CM`** to access the service processor Command menu.

**Step 6.** Issue the **`CC`** command, select **`G`** for Genesis Complex Profile, and specify the cabinet and cell slot for the cell that will comprise the Genesis Partition.

```
GSP:CM> CC

This command allows you to change the complex profile.

WARNING: You must shut down all Protection Domains before executing
         this command.


G - Genesis Complex Profile
L - Last Complex Profile
    Select Profile: g

    Enter Cabinet number: 0

    Enter Slot number: 0

    Do you want to modify the complex profile? (Y/[N]) y

    -> The complex profile will be modified.
GSP:CM>
```

You can confirm that the Genesis Partition was successfully created if the `CC` command reports that the "complex profile will be modified".

If the `CC` command reports "Sorry, command failed" then the Genesis Partition was not created, possibly because one or more nPartitions are

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not at a ready for reconfig state. If this is the case, go back to *Step 3* and ensure all nPartitions are inactive at a ready for reconfig state.

**Step 7.** Issue the **BO** command to boot the Genesis Partition past its ready for reconfig state and make it an active nPartition.

When a Genesis Partition is created, it remains at boot-is-blocked (in an inactive, ready for reconfig state), so you must boot it manually.

The Genesis Partition always is assigned partition number 0, because when it is created it is the first and only nPartition in the server complex.

Using the BO command to boot partition 0 will boot the Genesis Partition to its Boot Console Handler (BCH) interface.

```
GSP:CM> BO

This command boots the selected partition.

    #   Name
   --   ----
    0)  Partition 0

    Select a partition number : 0

    DO you want to boot partition number 0,
    named Partition 0 ? (Y/[N]) y

    -> The selected partition will be booted.
GSP:CM>
```

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**Step 8.** Access the Genesis Partition's console and configure the partition as appropriate and necessary.

From the service processor Command menu, enter **MA** to return to the Main menu, then enter **CO** to access the Console menu. The Genesis Partition is partition 0 and by default is named "Partition 0".

You will need to set the boot paths (PRI, ALT, and HAA), any core cell choices, the partition name, and other settings as appropriate. You also may need to add cells to the Genesis Partition if you want it to have more than one cell.

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# Creating a New nPartition

In a server complex you can create multiple nPartitions if the server has enough cells and core I/O to support the partitions.

You can create a new nPartition by using the following methods:

- *HP-UX Commands* on page 208

  *This procedure (using the parstatus, parcreate, and parmodify commands) creates and configures a new nPartition from HP-UX.*

- *Partition Manager* on page 212

  *This procedure (Partition —> Create Partition action) creates a new nPartition using Partition Manager.*

At least one cell in each nPartition must be connected to an I/O chassis that has core I/O attached. To boot HP-UX the nPartition also must have a boot device and any required PCI cards and devices installed.

When creating an nPartition you should adhere to the HP partition requirements and guidelines. HP recommends only specific sets of nPartition configurations.

If no partitions exist in a server complex, you must first establish a Genesis Partition before creating other partitions.

## HP-UX Commands

This procedure (using the **`parstatus`**, **`parcreate`**, and **`parmodify`** commands) creates and configures a new nPartition from HP-UX.

This procedure uses `parstatus` to find available (unassigned) cells, uses `parcreate` to create a partition using the cells, and uses `parmodify` to modify the partition's settings and configure it for use.

One alternative to using this complete procedure is to replace steps 2–5 with a single `parcreate` command.

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For example, the commands performed in steps 2–5 could be replaced with the following `parcreate` command line.

```
# parcreate -c4:base:y:r1 -c6:base:y:r1 -P "hostname05" -r0/4 -r0/6 -b 4/0/1/0/0.9 -B
Partition Created. The partition number is : 1
#
```

In the above alternative command line the `-B` option is specified, thus causing the partition to be booted past boot-is-blocked immediately, thus making the new nPartition active. (It is booted to its BCH interface.)

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**Step 1.** Log in to HP-UX running on an existing nPartition in the server complex, and plan your partition configuration by selecting which cells will comprise the new partition.

Use the **`parstatus -AC`** command to list all unassigned (available) cells in the server complex.

```
# parstatus -AC
[Cell]
                        CPU     Memory                                  Use
                        OK/     (GB)                            Core    On
Hardware    Actual      Failed/ OK/                             cell    Next Par
Location    Usage       Max     Failed  Connected To            Capable Boot Num
==========  ==========  ======= ======= ====================    ======= ==== ===
cab0,cell1  absent      -       -       -                       -       -    -
cab0,cell3  absent      -       -       -                       -       -    -
cab0,cell4  power on    4/0/4   2.0/0.0 cab 0,bay0,chassis3     yes     -    -
cab0,cell5  absent      -       -       -                       -       -    -
cab0,cell6  power on    4/0/4   2.0/0.0 cab 0,bay1,chassis1     yes     -    -
cab0,cell7  absent      -       -       -                       -       -    -

#
```

You can select any of the cells listed to create the new partition; only the cells that are *not "absent"* are present within the server complex.

All cells that you choose **must** meet the hardware requirements for nPartitions (for example, they all must have the same processor revision and firmware) and **should** form an HP-recommended nPartition configuration. At least one cell must have an I/O chassis with core I/O.

**Step 2.** After confirming that cells you have chosen would establish a valid nPartition configuration, use the **`parcreate -c`**... command to create a new nPartition with the cells.

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When using the `parcreate` command, *do not* specify the `-B` option for this procedure.

(The `-B` option causes `parcreate` to immediately boot the newly created partition past the default ready for reconfig state, thus making the nPartition active and preventing you from further modifying it.)

By *not* specifying `-B`, the new partition can be further modified because it will remain inactive at a ready for reconfig state (until you boot it using the service processor Command menu's `BO` command).

If creating a single-cell nPartition, just use one `-c` option.

To create a multiple-cell nPartition, you should specify the `-c` option multiple times (once for each cell) issuing a single command line.

```
# parcreate -c4:base:y:ri -c6:base:y:ri
Partition Created. The partition number is : 1
#
```

When `parcreate` successfully creates a new nPartition, it reports "Partition Created" and reports the partition number ("partition number is...").

If parcreate detects any problems or issues when creating an nPartition, it lists them in its output. If it cannot create the partition, `parcreate` reports "Command failed" along with more details.

The `parcreate` command's `-c` option is as follows:

`-c` *cell*`:[`*cell_type*`]:[`*use_on_next_boot*`]:[`*failure_usage*`]`

This option specifies the cell ID (*cell*) to be assigned to the partition.

- The only valid *cell_type* value is: `base` (base cell, the default).
- The valid *use_on_next_boot* values for cells are:

  | | |
  |---|---|
  | `y` | Participate in reboot (the default). |
  | `n` | Do not participate in reboot. |

- The only valid *failure_usage* value is: `ri` (reactivate with interleave, the default).

For details, see the *parcreate*(1M) manpage.

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**Step 3.** Use the **`parmodify`** command to modify the new nPartition's configuration and set the partition name (`-P`), boot paths (`-b`, `-s`, and `-t`), and any core cell choices (`-r`).

When using the `parmodify` command you must use the `-p#` option to specify the partition number for the nPartition. Use the partition number that the `parcreate` command reported in *Step 2*.

```
# parmodify -p1 -P "hostname05"
Command succeeded.
# parmodify -p1 -r0/4 -r0/6
Command succeeded.
# parmodify -p1 -b 4/0/1/0/0.9
Command succeeded.
#
```

When each modification takes place, `parmodify` reports "Command succeeded". Otherwise it reports any problems.

You can specify each configuration option on a separate command line or can combine all options into a single, longer command line.

For details on the various options for modifying partition settings, see the *parmodify*(1M) manpage.

**Step 4.** Use the **`parstatus -V -p#`** command to list all details about your newly created and configured partition.

If any configuration details should be modified, use the `parmodify` command before you boot the partition in the next step.

```
# parstatus -V -p1
[Partition]
Partition Number       :  1
Partition Name         : hostname05
Status                 : inactive
IP address             :
Prmary Boot Path       : 4/0/1/0/0.9
ALternate Boot Path    : 0/0/0/0/0/0/0/0.0.0
HA Alternate Boot Path : 0/0/0/0/0/0/0/0.0.0
PDC Revision           : 104.1
IODCH Version          : 23664
CPU Speed              : 552 MHz
Core Cell              : ?
Core Cell Alternate    :
                0. cab0,cell4
                1. cab0,cell6
[Cell]
                        CPU     Memory                                  Use
                        OK/     (GB)                            Core    On
Hardware   Actual       Failed/ OK/                             cell    Next Par
Location   Usage        Max     Failed    Connected To          Capable Boot Num
========== ============ ======= ========= ==================== ======= ==== ===
cab0,cell4 inactive     4/0/4    2.0/ 0.0 cab 0,bay0,chassis3 yes     yes  1
cab0,cell6 inactive     4/0/4    2.0/ 0.0 cab 0,bay1,chassis1 yes     yes  1
```

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**Step 5.** Boot your newly created nPartition past boot-is-blocked to make it active and make its BCH interface available.

Use the service processor Command menu's **BO** command to boot the partition.

Once the nPartition is booted, you can access its BCH interface through its console. Use the service processor Console menu (enter **CO** at the service processor Main menu).

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**Partition Manager**

This procedure (**Partition —> Create Partition** action) creates a new nPartition using Partition Manager.

**Step 1.** Plan your nPartition configuration by selecting which cells will comprise the new partition.

All cells that you choose **must** meet the hardware requirements for nPartitions (for example, they all must have the same processor revision and firmware) and **should** form an HP-recommended nPartition configuration. At least one cell must have an I/O chassis with core I/O.

**Step 2.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

You optionally can specify the `parmgr -t create` command and options to automatically launch the **Partition —> Create Partition** action. See the *parmgr* (1M) manpage for command option details.

**Step 3.** Select the **Partition —> Create Partition** action to run the Partition Manager task wizard for creating a new nPartition.

Partition Manager guides you through the steps it requires for creating a new nPartition.

You can move backward and forward through the steps by using **Next** and **Back** buttons. At the final steps, you can verify the settings you have established for the new nPartition and, if they are correct for your purposes, click the **Finish** button to create the new nPartition.

You can *cancel the new nPartition* creation at any time by clicking the **Cancel** button.

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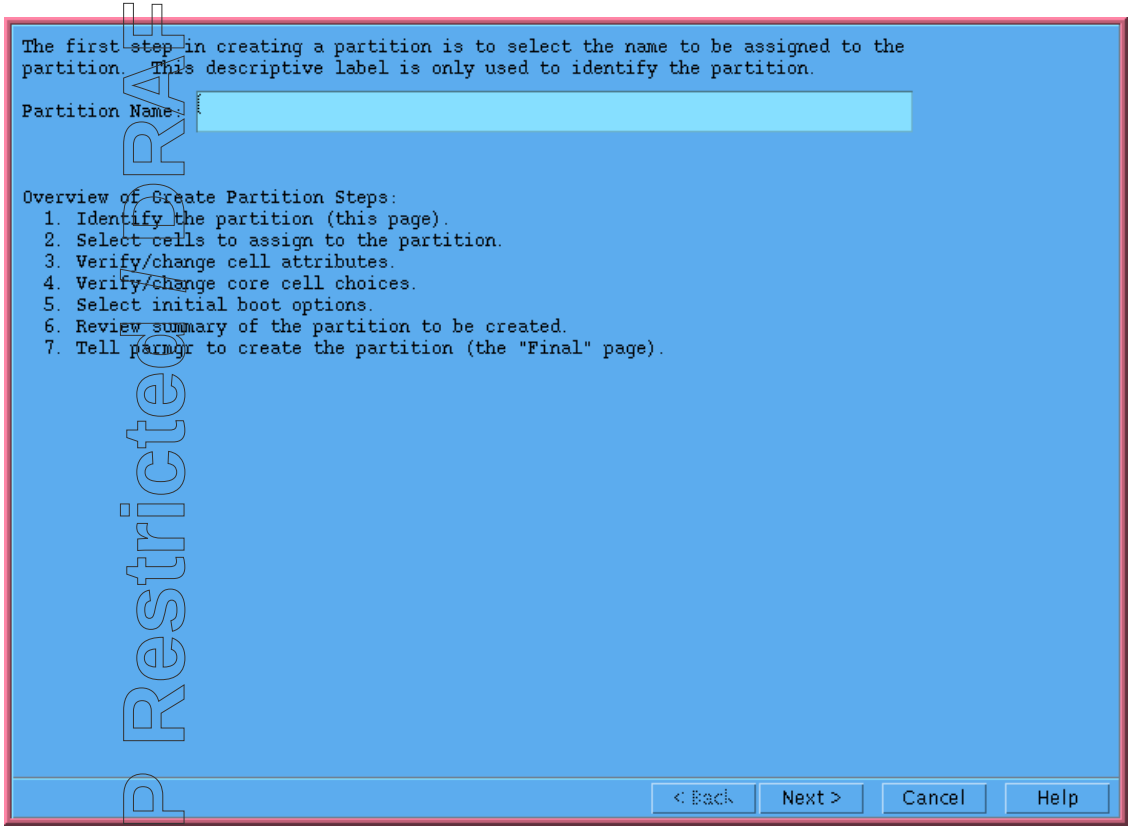
The following window shows the first step and overview for Partition Manager's create **Partition —> Create Partition** action.


The first step in creating a partition is to select the name to be assigned to the partition. This descriptive label is only used to identify the partition.
Partition Name:
Overview of Create Partition Steps:
1. Identify the partition (this page).
2. Select cells to assign to the partition.
3. Verify/change cell attributes.
4. Verify/change core cell choices.
5. Select initial boot options.
6. Review summary of the partition to be created.
7. Tell parmgr to create the partition (the "Final" page).
< Back
Next >
Cancel
Help

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If you specify for Partition Manager to automatically boot the new nPartition, you can access the new nPartition's BCH interface from its console when you finish using the create partition task wizard.

Otherwise, if you *do not* specify to automatically boot the new nPartition, you must use the service processor Command menu's **BO** command to boot the partition past boot-is-blocked (inactive, ready for reconfig state) and make its BCH interface available.

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# Adding Cells to an nPartition

You can add cells to the local nPartition or to any remote nPartitions in the same server complex.

Adding cells to an nPartition involves selecting available cells (those not currently assigned to a partition) and assigning them to an existing partition. Both the selected cells and any I/O chassis connected to the cells are assigned to the designated nPartition.

You can add cells to an nPartition by using the following methods:

- *HP-UX Commands* on page 215

  *This procedure (using the parstatus and parmodify commands) adds cells to an nPartition using HP-UX commands.*

- *Partition Manager* on page 216

  *This procedure (the Partition —> Modify Partition menu, Add/Remove Cells tab) adds cells to an nPartition from Partition Manager.*

When adding cells to an nPartition you should adhere to HP's nPartition requirements and guidelines.

### Reboot for Reconfig Guidelines

In some situations you must immediately perform a reboot for reconfig of a modified nPartition after adding cells to it.

- You **must** immediately perform a reboot for reconfig (`shutdown -R`) of an nPartition when you have added a cell to an active nPartition and you specified the `-B` option to the `parmodify` command.
- You **should** perform a reboot for reconfig of an nPartition *as soon as possible* after you have added a cell to an active nPartition and have specified a "y" use-on-next-boot value for the new cell.
- You need not perform a reboot for reconfig of an nPartition in these situations:
  - — When you have added a cell to an inactive nPartition.
  - — When you have added a cell with a "n" use-on-next-boot value and you did not specify the `-B` option to the `parmodify` command.

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**HP-UX Commands** This procedure (using the **parstatus** and **parmodify** commands) adds cells to an nPartition using HP-UX commands.

**Step 1.** Use the **parstatus -A -C** command to list all available cells (the unassigned cells) in the server complex.

**Step 2.** Choose one or more eligible cells from the list to add to the nPartition.

Adding the cell(s) to the nPartition should create a configuration that adheres to the hardware requirements and performance guidelines.

**Step 3.** Modify the nPartition by issuing the **parmodify -p# -a#...** command to add the cell.

The `-p#` option specifies the partition number (*#*) for the nPartition being modified.

The `-a` *`cell`*`:`*`type`*`:`*`use`*`:`*`fail`* option specifies the cell ID and other details for the cell to be added to the nPartition.

To add multiple cells you can specify the `-a` option multiple times in the same command.

For example: `parmodify -p1 -a0:base:y:ri -a2:base:y:ri` adds two cells (cell ID 0 and cell ID 2) to nPartition number 1.

The `-a` option (`-a` *`cell`*`:`*`type`*`:`*`use`*`:`*`fail`*) specifies the following details for each cell that you add to the nPartition.

| | |
|---|---|
| *`cell`* | The cell to be added to the nPartition. You can specify the cell in global (*cell*) format or in hardware location (*cabinet*/*slot*) format. |
| *`type`* | The cell type: `base` is the only supported cell type and it is the default. |
| *`use`* | The cell's use-on-next-boot value: `y` or `n`. Use `y` (the default) if the cell is to be an active member of the partition, or use `n` if the cell is to remain an inactive member. |
| *`fail`* | The cell's failure usage: `ri` (reactivate with interleave) is the only supported failure usage policy and it is the default. |

You can optionally specify the `parmodify` command's `-B` option to require that the modified partition be rebooted.

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- When you specify `-B` to modify an *inactive* nPartition, the inactive partition completes partition rendezvous and becomes active if possible.
- When you specify `-B` to modify an *active* nPartition, you must perform a reboot for reconfig of the nPartition before any other cell assignment changes can be made within the server complex.

The `parmodify -p1 -a0:base:y:ri -a2:base:y:ri` command adds cell 0 and cell 2 to partition number 1. This command also sets a "y" use-on-next-boot value for both cells, meaning that they will be active members of the partition following the next time all cells boot (for example, when reboot for reconfig is performed on the partition.

Because this example command does not include the `-B` option, if partition 1 were an *inactive partition* it would remain inactive, and if it were an *active partition* the new cells would be assigned but they would remain inactive cells until a reboot for reconfig is performed.

See the *parmodify* (1M) manpage for details on all options.

**Step 4.** As needed, perform a reboot for reconfig (**`shutdown -R`**) on the modified partition.

See the *Reboot for Reconfig Guidelines* on page 214 for details on when to perform a reboot for reconfig.

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**Partition Manager**

This procedure (the **Partition —> Modify Partition** menu, **Add/Remove Cells** tab) adds cells to an nPartition from Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** In the Partition Manager primary window, select the nPartition to which you want to add cells, then select the **Partition —> Modify Partition** menu item.

**Step 3.** In the Modify Partition window, click the **Add/Remove Cells** tab.

**Step 4.** Select the cells that you want to add to the nPartition from the Available Cells list, then click the **Add** button to add them to the partition's cell list.

If adding multiple cells, you can select multiple cells by pressing the **Control** key while clicking on the cells.

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Adding the cell(s) to the nPartition should create a configuration that adheres to the hardware requirements and performance guidelines.

**Step 5.** After you add the new cells to the partition's cell list, click the **OK** button.

The cells are not actually *assigned* to the nPartition until after the next step.

**Step 6.** Review the information shown in the **Notes and Warnings**, the **Summary of Changes**, and the **HA Checks** tabs.

Partition Manager generates this information when it checks details of the new partition configuration, such as cell compatibility and various high-availability guidelines.

To cancel all partition changes, click the **Cancel** button in the Notes and Warnings window and then click **Cancel** in the Modify Partition window.

To proceed with adding the cell(s) to the partition, click **OK**.

**Step 7.** Once Partition Manager confirms that the "partition has been successfully modified" click the **OK** button.

The cells are assigned to the nPartition after clicking **OK** in the previous step. However, any cells you have added to an active nPartition will remain *inactive* until you perform a reboot for reconfig of the modified nPartition.

**Step 8.** As needed, perform a reboot for reconfig (`shutdown -R`) of the modified nPartition.

See the *Reboot for Reconfig Guidelines* on page 214 for details on when to perform a reboot for reconfig.

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# Removing Cells from an nPartition

Removing a cell from an nPartition involves unassigning the cell from the partition to which it is assigned and, if necessary, performing a reboot for reconfig of the nPartition.

You can remove *any cell* from the local nPartition and can remove *inactive cells* from remote partitions in the same server complex. However, at least one core-capable cell must remain in each partition.

You can remove (unassign) cells from nPartitions by using these methods:

- *HP-UX Commands* on page 219

  *This procedure (using the parstatus and parmodify commands) removes cells from an nPartition using HP-UX commands.*

- *Partition Manager* on page 221

  *This procedure (Partition —> Modify Partition action, Add / Remove Cells tab) removes cells from an nPartition using Partition Manager.*

When removing cells from an nPartition, you should ensure that the modified partition still adheres to the hardware requirements and performance guidelines for nPartitions.

After you remove a cell from an nPartition, the cell's I/O chassis also is removed from the partition. As a result, any I/O devices associated with the cell are made unavailable to the partition after the cell is removed.

If you want to remove the last cell in an nPartition, you must instead remove the partition using the `parremove` command or Partition Manager.

Once a cell is unassigned, the cell (and any I/O resources connected to the cell) is considered to be an available resource that is on the "free cell list" and can be assigned to any nPartition in the server complex.

### Reboot for Reconfig Guidelines

In some situations you must immediately perform a reboot for reconfig (`shutdown -R`) of a modified nPartition after removing cells from it. Performing a required reboot for reconfig completes cell assignment changes and unlocks the server's Complex Profile.

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- You **must** immediately perform a reboot for reconfig of an nPartition when you have removed an *active cell* from the partition.
- You **must** immediately perform a reboot for reconfig of an nPartition when you have removed a cell from an active nPartition and specified the `-B` option to the `parmodify` command.
- You need not perform a reboot for reconfig of an nPartition when you have removed an *inactive* cell from a partition and did not specify the `-B` option to the `parmodify` command.

In the cases where you must immediately perform a reboot for reconfig after removing a cell, *not doing so* will leave the Complex Profile locked and thus will prevent any other changes to the server complex configuration. In these cases, the reboot for reconfig is required to complete the cell assignment changes and permit other changes to occur.

**HP-UX Commands** This procedure (using the **`parstatus`** and **`parmodify`** commands) removes cells from an nPartition using HP-UX commands.

**Step 1.** List the current nPartition assignments and status for the cells you plan to remove from their assigned nPartition by issuing the **`parstatus -c#...`** HP-UX command.

Specify each cell you plan to remove with a separate `-c` option.

For example, to list details on cells 0, 1, and 2, issue the `parstatus -c0 -c1 -c2` command.

The cells must all be assigned to the same nPartition in order to remove them using a single procedure. Otherwise, if the cells are assigned to different partitions, you must perform this procedure separately for each nPartition.

In order to remove cells that are not assigned to the local nPartition, the cells must be *inactive* (their "Actual Usage" must be "inactive"). You can list the local partition by issuing the `parstatus -w` command.

To remove an *active* cell from its nPartition, you must do so when logged in to HP-UX running on the cell's partition.

**Step 2.** Remove the cell from the partition to which it is assigned by using the **`parmodify -p# -d#...`** command.

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Specify the partition number (`-p#`) and each cell (`-d#`) that you want to remove from the partition.

If removing *multiple cells* from a partition, specify each cell with a separate `-d#` option on the same command line (such as: `parmodify -p1 -d0 -d2...` to remove cells 0 and 2 from partition number 1).

Slightly different procedures are required for removing active cells and inactive cells. See the following information for details (*Removing an Active Cell* and *Removing an Inactive Cell*).

When you are removing multiple cells from the local nPartition, if at least one of the cells you plan to remove is currently active then you should follow the guidelines for removing active cells.

- **Removing an Active Cell**

  You **should** specify the `-B` option to `parmodify` when removing an active cell from the local nPartition if you want the partition become active following its reboot for reconfig.

  For example, the following command removes cell 4 from partition 0 and the `-B` option ensures that the partition will be active following its reboot for reconfig.

```
# parmodify -p0 -d4 -B
Cell 4 is active.
Use shutdown -R to shutdown the system to ready for reconfig state.
Command succeeded.
#
```

  You **must** perform a reboot for reconfig (`shutdown -R`) after you issue the `parmodify` command to remove active cell(s) from the partition. (This is covered in *Step 3* that follows.)

- **Removing an Inactive Cell**

  When removing an *inactive* cell from an nPartition you do not need to specify the `-B` option to `parmodify` and do not need to perform a reboot for reconfig of the cell's partition.

  When you use `parmodify` to remove an inactive cell, the cell is immediately unassigned from its nPartition.

  If you specify the `-B` option when removing an *inactive cell* from an *inactive nPartition*, then cell is immediately removed and the

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modified partition is booted past its inactive ready for reconfig state and becomes an active nPartition.

For example, the following command removes cell 2 from partition 0. Because cell 2 is inactive, it is immediately unassigned.

```
# parmodify -p0 -d2
Command succeeded.
#
```

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**Step 3.** As needed, perform a reboot for reconfig (`shutdown -R`) of the partition being modified.

You **must** perform a reboot for reconfig if you have removed an *active cell* or have specified the `-B` option when modifying an *active nPartition*.

See the *Reboot for Reconfig Guidelines* on page 218 for details on when to perform a reboot for reconfig.

This reboot for reconfig enables the cell removal to complete and the Complex Profile to be unlocked.

If you have removed an active cell and you did not specify the `-B` option to `parmodify`, then the nPartition will remain *inactive* in a ready for reconfig state after you perform the reboot for reconfig. To make the inactive partition active, use the service processor Command menu's `BO` (boot) command.

**Partition Manager**

This procedure (**Partition —> Modify Partition** action, **Add/Remove Cells** tab) removes cells from an nPartition using Partition Manager.

**Step 1.** Determine which cell(s) you want to remove from the partition.

The cells must all be assigned to the same nPartition in order to remove them using a single procedure. Otherwise, if the cells are assigned to different partitions, you must perform this procedure separately for each nPartition.

**Step 2.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 3.** In the Partition Manager primary window, select the nPartition from which you want to remove cells, then select the **Partition —> Modify Partition** action.

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**Step 4.** In the Modify Partition window, click the **Add/Remove Cells** tab.

**Step 5.** Select the cells that you want to remove from the nPartition from the "Cells in the Partition" list, then click the **Remove** button to move them to the Available Cells list. If removing multiple cells, you can select multiple cells by pressing the **Control** key while clicking on the cells.

Removing the cell(s) from the partition should create a configuration that adheres to the hardware requirements and performance guidelines.

**Step 6.** After you have removed the cells from the partition's cell list, click the **OK** button.

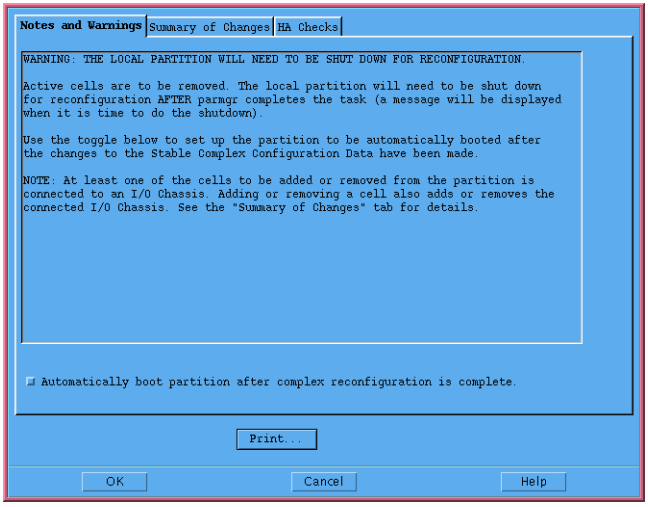
The cells are not actually *removed* from the partition until after the next step.

**Step 7.** Review the information shown in the **Notes and Warnings**, the **Summary of Changes**, and the **HA Checks** tabs.

Partition Manager generates this information when it checks details of the new partition configuration.

If you **must** perform a reboot for reconfig of the nPartition, such as when removing an active cell from the partition, then the Notes and Warnings tab provides details and options.

- If a reboot for reconfig is required, the Notes and Warnings tab has information about the reboot procedure. (See *Step 9* for details.)


Notes and Warnings
Summary of Changes
HA Checks
WARNING: THE LOCAL PARTITION WILL NEED TO BE SHUT DOWN FOR RECONFIGURATION.
Active cells are to be removed. The local partition will need to be shut down for reconfiguration AFTER parmgr completes the task (a message will be displayed when it is time to do the shutdown).
Use the toggle below to set up the partition to be automatically booted after the changes to the Stable Complex Configuration Data have been made.
NOTE: At least one of the cells to be added or removed from the partition is connected to an I/O Chassis. Adding or removing a cell also adds or removes the connected I/O Chassis. See the "Summary of Changes" tab for details.
Automatically boot partition after complex reconfiguration is complete.
Print...
OK
Cancel
Help

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- When a reboot for reconfig is required, the Notes and Warnings tab also has a check box ("Automatically boot partition") that—when selected—enables the partition to rendezvous and be active after the reboot for reconfig.

To cancel all partition changes, click the **Cancel** button in the Notes and Warnings window and then click **Cancel** in the Modify Partition window.

To proceed with removing the cell(s) from the partition, click **OK**.

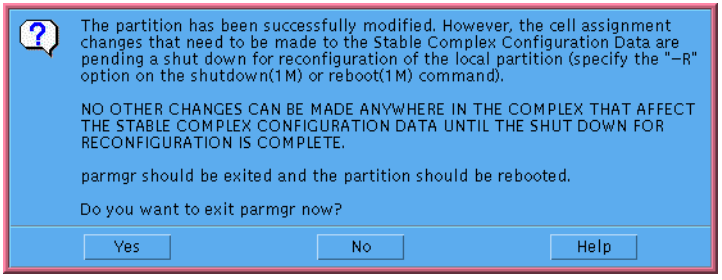
**Step 8.** When Partition Manager confirms that the "partition has been successfully modified" review any additional information and respond as needed to the dialog box presented.

(The cells were designated to be removed from the nPartition after completing the previous step, however a reboot may be required.)

- If you have removed only *inactive* cells from the nPartition, Partition Manager provides no additional info and you can click **OK** to complete the procedure (a reboot is not needed).

- If you have removed one or more *active* cells from the nPartition, then Partition Manager provides more info about performing the required reboot for reconfig of the partition.

  You **must** reboot the nPartition as soon as possible, so you should click the **Yes** button to exit Partition Manager and proceed with the next step of this procedure.


The partition has been successfully modified. However, the cell assignment changes that need to be made to the Stable Complex Configuration Data are pending a shut down for reconfiguration of the local partition (specify the "-R" option on the shutdown(1M) or reboot(1M) command).
NO OTHER CHANGES CAN BE MADE ANYWHERE IN THE COMPLEX THAT AFFECT THE STABLE COMPLEX CONFIGURATION DATA UNTIL THE SHUT DOWN FOR RECONFIGURATION IS COMPLETE.
parmgr should be exited and the partition should be rebooted.
Do you want to exit parmgr now?
Yes
No
Help

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**Step 9.** As needed, perform a reboot for reconfig (**`shutdown -R`**) of the modified nPartition.

- If you have removed only inactive cells from an nPartition, then you *do not* need to perform a reboot for reconfig of the nPartition.
- If you have removed any active cells from the nPartition, then you **must** perform a reboot for reconfig and will have seen a detailed message about rebooting from Partition Manager (see *Step 8*).

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# Deleting (Removing) an nPartition

You can delete (remove) any nPartition within a server complex.

The HP-UX nPartition deletion capabilities include restrictions for security reasons: you can delete only the *local nPartition* and *inactive remote* nPartitions.

You can delete an nPartition using these methods:

- *HP-UX Commands* on page 225

  *This procedure (using the parremove command) deletes an nPartition using HP-UX commands.*

- *Partition Manager* on page 227

  *This procedure (Partition —> Delete Partition action) removes an nPartition using Partition Manager.*

When removing the local nPartition, you must complete the procedure by issuing the **`shutdown -R -H`** command *as soon as possible* after initiating the local nPartition's removal.

Deleting an nPartition causes all of the partition's cells (and any I/O resources connected to the cells) to be unassigned. As a result, all of these cells become available resources that are on the "free cell list" and can be assigned to any nPartition in the server complex.

## HP-UX Commands

This procedure (using the **`parremove`** command) deletes an nPartition using HP-UX commands.

**Step 1.** Use the **`parstatus -P`** command to list all nPartitions, and check the status (active or inactive) for the partition you plan to remove.

To check the *local* partition number, use the `parstatus -w` command. The local nPartition always is active when it is running HP-UX.

If you are planning to remove a *remote* nPartition, check to see whether the remote partition is inactive.

**Step 2.** If a remote nPartition that you plan to remove currently is *active*, then put the partition into a ready for reconfig state to make it inactive.

If the remote partition is running HP-UX, you can shut down the partition to a ready for reconfig state by 1) logging in to HP-UX on the

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remote nPartition, 2) shutting down all applications and warning users, and 3) issuing the `shutdown -R -H` command.

You also can put the partition into a ready for reconfig state by using the BCH interface's `RECONFIGRESET` command or the service processor Command menu's `RR` command.

**Step 3.** Save all current configuration details about the nPartition you plan to remove.

Use the **`parstatus -V -p`**# command to display all current configuration information related to the partition you plan to remove.

Save this information, as you can use it to manually recreate the partition if necessary at a later time.

**Step 4.** Remove the nPartition.

Use one of the following procedures (*Removing an Inactive Remote Partition* or *Removing the Local nPartition*) to remove the partition.

- **Removing an Inactive Remote Partition**

1. Issue the `parremove -p#` command to remove the inactive remote nPartition, where the `-p#` option specifies the partition number. For example:

   # **`parremove -p1`**

2. Issue the `parstatus -P` command to confirm that the partition was removed.

   If the nPartition was removed, it no longer is listed in the `parstatus` command's output.

- **Removing the Local nPartition**

  To remove the local nPartition (the partition on which you currently are issuing commands) perform the following steps.

1. Shut down all applications and warn users. Follow the same procedures you would use if you were to reboot the partition.

2. Issue the `parremove -F -p#` command, which initiates the complex profile revisions that will take place when the nPartition is removed.

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When using `parremove` to remove the local nPartition, you must specify both the `-p#` option (to specify the local partition number) and the `-F` option (to force-remove the local partition).

Note that the local nPartition remains active following the `parremove -F -p#` command, until you perform a shutdown for reconfig (`shutdown -R -H`) to complete the removal.

*As soon as possible* you should proceed with the shutdown for reconfig because the server Complex Profile will remain locked—and no other changes can occur—until the pending nPartition removal is completed.

3. Perform a shutdown for reconfig (`shutdown -R -H`) of the local nPartition.

   The `shutdown -R -H` command shuts down the partition and all cells so that the configuration changes occur and the partition is deleted.

After you complete the partition removal, the nPartition no longer exists—its configuration information has been deleted.

All cells (and associated I/O chassis) that used to be assigned to the deleted nPartition now are unassigned and can be assigned for other uses.

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**Partition Manager**

This procedure (**Partition —> Delete Partition** action) removes an nPartition using Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** In the Partition Manager primary window, select the nPartition you want to remove.

Click the partition's name in the list on the left side of the primary window to select the nPartition.

If you plan to remove a *remote nPartition*, after you select the partition's name all of the partition's hardware (listed on the right side of the primary window) should be listed as having an Actual Usage of "inactive". To remove a remote nPartition it must be inactive.

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**Step 3.** Select the **Partition —> Delete Partition** action to request that the selected nPartition be removed (deleted).

Partition Manager presents the following window to confirm whether you want to delete the selected nPartition.

You can view details about the nPartition by clicking the **Show Details** button, or cancel the deletion by clicking **Cancel**.

**Step 4.** Proceed with the nPartition deletion by clicking the **OK** button in the Partition Manager confirmation window.

**Step 5.** Perform any remaining tasks (such as a `shutdown -R -H`) as needed.

You may need to perform a shutdown for reconfig, depending on the type of nPartition you are removing (local or remote) and its state (active or inactive). Review the following list for details:

- If you are removing a *remote* nPartition that was *inactive*, the nPartition was removed immediately so this removal procedure is finished and you do not need to perform any shutdowns.
- If you attempt to remove a *remote* nPartition that is *active*, Partition Manager cannot remove the remote partition. You first must make the remote nPartition inactive by putting it into a ready for reconfig state.

  To put the remote partition in a ready for reconfig state: log in to the remote partition and issue the `shutdown -R -H` command, or issue the BCH `RECONFIGRESET` command or the service processor `RR` command for the remote nPartition.

  After the remote partition is inactive, you must perform this removal procedure again using Partition Manager on the local partition if you want to remove the remote nPartition.
- If you are removing the *local* nPartition, Partition Manager will display the following information to you after you click **OK** to remove the partition.

  To complete the local partition's removal, you must perform a shutdown for reconfig (`shutdown -R -H`) of the local nPartition as soon as possible.

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Because the Complex Profile will remain locked until the local partition's removal is completed, no other changes can occur in the server complex until you perform the shutdown for reconfig.

After Partition Manager removes an nPartition, the nPartition no longer exists—its configuration information has been deleted.

All cells (and associated I/O chassis) that used to be assigned to the deleted nPartition now are unassigned and are available resources that can be assigned for other uses.

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# Naming and Renaming nPartitions

Each nPartition has both a partition *number* and a partition *name*.

The **partition name** for each nPartition can have from 1 to 64 characters, including upper- and lowercase letters; numbers; and dashes, underscores, and spaces (“-” “_” and “ ”).

You can customize each partition’s name to help you distinguish among the nPartition in a server complex. (You cannot change the partition number, which is a permanent unique identifier that is automatically assigned for each nPartition in a server complex.)

You can name and rename nPartitions using these methods:

- *BCH* on page 230

  *This procedure (Configuration menu, PD command) checks and sets the local partition’s name from the BCH interface.*

- *HP-UX Commands* on page 231

  *This procedure (parmodify -p# -P name) sets the partition name for nPartitions using HP-UX commands.*

- *Partition Manager* on page 232

  *This procedure (Partition —> Modify Partition action, General tab) names and renames nPartitions using Partition Manager.*

Partition names are displayed (along with partition numbers) in various reports and menus provided by the service processor, Boot Console Handler (BCH), and the HP-UX partition tools. Note that some utilities display only the first 30 characters of partition names.

## BCH

This procedure (Configuration menu, **PD** command) checks and sets the local partition’s name from the BCH interface.

**Step 1.** Log in to the service processor for the server complex in which the nPartition resides.

**Step 2.** Access the partition’s console.

From the service processor Main menu, enter **CO** to access the console menu and select the partition.

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If necessary, type **^ecf** (**Control-e c f**) to get write access for the console.

Note that if the partition is booted to HP-UX, you should instead use the HP-UX command method of modifying the partition name.

**Step 3.** Access the BCH interface's Configuration menu.

From the Main menu, enter **CO** to access the Configuration menu.

If at another BCH menu, enter MA to access the Main menu, then enter CO for the Configuration menu.

**Step 4.** At the BCH Configuration menu, use the **PD** command to check and set the local partition's name.

Enter PD to check the current name, or enter PD *New Name* to set the partition's name to the new name. No quotation marks are needed when specifying the new name.

```
Configuration Menu: Enter command > PD

Partition Number: 1
  Partition Name: Partition 1
Configuration Menu: Enter command >

Configuration Menu: Enter command > PD My New Name

  Partition Name: My New Name
Configuration Menu: Enter command > PD

Partition Number: 1
  Partition Name: My New Name
Configuration Menu: Enter command >
```

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**HP-UX Commands** This procedure (**parmodify -p# -P *name***) sets the partition name for nPartitions using HP-UX commands.

**Step 1.** List the current partition states and names using the parstatus -P command.

This shows all partitions, their current status (active or inactive) and their partition numbers and partition names.

**Step 2.** Use the parmodify -p# -P *name* command to set the partition name for any of the nPartitions in the server complex.

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Specify both the partition number (`-p#`) and the new name for the partition (`-P` *name*). If the partition name contains spaces then quotation marks must surround the name.

```
# parmodify -p1 -P "New Name"
Command succeeded.
#
```

You can list the nPartition's new name by using the `parstatus -p#` command or `parstatus -P`.

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**Partition Manager**

This procedure (**Partition —> Modify Partition** action, **General** tab) names and renames nPartitions using Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** In the Partition Manager primary window, select the nPartition whose name you want to change.

Click the partition's name in the list on the left side of the primary window to select the nPartition.

**Step 3.** Select the **Partition —> Modify Partition** action, and access the **General** tab.

The nPartition name is listed—and can be edited—in the Partition Name field in the **General** tab.

**Step 4.** Edit the nPartition's name in the Partition Name field, and click **OK** when done editing the name (or click **Cancel** to cancel any changes).

**Step 5.** Review any Notes and Warnings that Partition Manager presents, and click **OK** to implement the name change (or click **Cancel** to cancel the change).

If there are any important notes or warnings, Partition Manager presents them in the window before completing the changes.

When the name change is complete, Partition Manager presents a final dialog box confirming that the partition was successfully modified.

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# Setting and Checking Cell Attributes

Each cell assigned to an nPartition has *use-on-next-boot* and *failure usage* attributes that determine how the cell is used within the partition.

You can list and set cell attributes by using these methods:

- *BCH* on page 234

  *This procedure (Configuration menu, CELLCONFIG command) lists and sets a cell's use-on-next-boot setting from the BCH interface for the cell's partition.*

- *HP-UX* on page 236

  *This procedure (parmodify -p# -m#...) lists and sets the use-on-next-boot and failure usage settings for cells using HP-UX commands.*

- *Partition Manager* on page 238

  *This procedure (Partition —> Modify Partition action, Change Cell Attributes tab) lists and sets the configurable cell attributes using Partition Manager.*

Each cell's use-on-next-boot and failure usage attribute settings establish the following behaviors for the cell:

- **Use-on-Next-Boot**

  The use-on-next-boot setting for each cell indicates whether the cell will be used (active) the next time the cell's partition is booted.

- **Failure Usage**

  The failure usage setting (called the "Failure Mode" in Partition Manager) for each cell indicates whether the cell will be used, if possible, if any processors or memory fail during the cell's self-tests.

**NOTE**

Currently the only one failure usage setting is supported: *reactivate with interleave* (`ri`).

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The reactivate-with-interleave setting allows a cell to actively join its partition following processor or memory failures during the cell's self tests. The cell joins its partition if at least one processor and any valid amount of memory passes self tests. Any of the cell's components that fail (processors or memory) are not available to the partition.

After changing a cell's attributes, the new attribute settings are used starting the next time the nPartition and cells are rebooted.

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**BCH**

This procedure (Configuration menu, **CELLCONFIG** command) lists and sets a cell's use-on-next-boot setting from the BCH interface for the cell's partition.

From the BCH interface you can modify only cell use-on-next-boot settings.

**Step 1.** Log in to the complex's service processor, access the partition's console, and access the BCH interface.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

**Step 2.** Access the BCH Configuration menu by entering **CO** from the BCH Main menu.

If you are at a BCH menu other than the Main menu, enter `MA` to return to the Main menu and then enter `CO` to access the Configuration menu.

**Step 3.** From the BCH configuration menu, use the **CELLCONFIG** command to list or set each cell's use-on-next-boot setting.

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**To list** the use-on-next-boot settings for all cells in the partition, issue the CELLCONFIG command with no arguments.

```
Configuration Menu: Enter command > CELLCONFIG

  Cell Configuration Data for Partition
 ---------------------------------------
  Configured Set  : 0x0000000000000050
  Deconfigured Set: 0x0000000000000000
  Free Cell Set   : 0xfffffffffffffaa


 Cell  Cab/Slot  Cell State  Configuration Status
 ----  --------  ----------  --------------------
   4     0/4       Alive       Configured
   6     0/6       Alive       Configured

Configuration Menu: Enter command >
```

**To change** the use-on-next-boot setting for a cell, issue the CELLCONFIG command with arguments: CELLCONFIG *cell* [ON|OFF]

For example, CELLCONFIG 6 OFF sets the use-on-next-boot setting for cell 6 to OFF. This causes the cell to be inactive (not rendezvous and thus not be used) the next time the partition boots.

```
Configuration Menu: Enter command > CELLCONFIG 6 OFF

 Are you sure you want to DECONFIGURE cell 6 for next boot? (y/[n]) >> y
 Cell 6 will be disabled during next reboot.

Configuration Menu: Enter command >
```

**Step 4.** Reboot the partition to use the cells' new use-on-next-boot settings.

If you have changed any cell use-on-next-boot settings for the partition, you should reboot the partition in either of two ways:

- Use the BCH interface's REBOOT command to perform a reboot.

  If you have only changed cell configurations from ON to OFF then perform a reboot using the REBOOT command. Any cells set to not be used will still be assigned to the partition but will not be used (will not rendezvous) in the partition.

- Use the BCH interface's RECONFIGRESET command to put the partition in a ready for reconfig state, then use the service processor Command menu's BO command to boot the partition.

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If you have changed any cell from OFF (“n”, do not use on next boot) to ON (“y”, use the cell on next boot) then you must perform these two tasks; this resets and reconfigures the partition and boots it.

**BCH**

```
Configuration Menu: Enter command > RECONFIGRESET
Reset the partition for reconfiguration of Complex Profile ...
```

**Service Processor (GSP or MP)**

```
GSP:CM> BO

This command boots the selected partition.

     #   Name
    ---  ----
     0)  jules00
     1)  jules01

    Select a partition number: 1

    Do you want to boot partition number 1? (Y/[N]) y

    -> The selected partition will be booted.
GSP:CM>
```

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**HP-UX**

This procedure (**`parmodify -p# -m#...`**) lists and sets the use-on-next-boot and failure usage settings for cells using HP-UX commands.

**Step 1.** Log in to HP-UX running on the nPartition.

You can log in to HP-UX on the partition either by connecting with `telnet` or `rlogin`, or by logging in to its complex’s service processor and accessing the partition’s console.

Connecting through the service processor allows you to maintain partition console access after HP-UX has shut down.

**Step 2.** From the HP-UX command line, use the `parstatus` command to list the use-on-next-boot and failure usage attribute settings for cells in the server complex.

You can list and modify any cell’s settings from HP-UX running on any partition in the server complex.

Use either `parstatus -C` or `parstatus -V -c#` to list the cell attribute settings. The following examples and text describe both these commands.

- A use-on-next-boot value of “yes” means the cell will be active as part of the partition the next time the partition boots.

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"Yes" is equivalent to a BCH cell configuration value of ON and "no" is equivalent to OFF.

- A failure usage setting of "activate" (equivalent to "ri") indicates that the cell is set to reactivate with interleave in the event of any failure during the cell's self test.

Use the `parstatus -C` command to list the use-on-next-boot setting for all cells, which is shown in the "Use On Next Boot" column.

```
# parstatus -C
[Cell]
                        CPU     Memory                                  Use
                        OK/     (GB)                            Core    On
Hardware   Actual       Deconf/ OK/                             Cell    Next Par
Location   Usage        Max     Deconf    Connected To          Capable Boot Num
========== ============ ======= ========= ==================== ======= ==== ===
cab0,cell0 active core  4/0/4    2.0/ 0.0 cab0,bay0,chassis1   yes     yes  0
cab0,cell1 absent       -       -         -                    -       -    -
cab0,cell2 active base  4/0/4    2.0/ 0.0 cab0,bay1,chassis3   yes     yes  0
cab0,cell3 absent       -       -         -                    -       -    -
cab0,cell4 active core  4/0/4    2.0/ 0.0 cab0,bay0,chassis3   yes     yes  1
cab0,cell5 absent       -       -         -                    -       -    -
cab0,cell6 active base  4/0/4    2.0/ 0.0 cab0,bay1,chassis1   no      yes  1
cab0,cell7 absent       -       -         -                    -       -    -

#
```

To list a specific cell's failure-usage and use-on-next boot settings, issue the `parstatus -V -c#` command and specify the cell number.

```
# parstatus -V -c2
[Cell]
Hardware Location       : cab0,cell2
Global Cell Number      : 2
Actual Usage            : active base
Normal Usage            : base
Connected To            : cab0,bay1,chassis3
Core Cell Capable       : yes
Firmware Revision       : 6.0
Failure Usage           : activate
Use On Next Boot        : yes
Partition Number        : 0

Memory OK     : 2.00 GB
Memory Deconf : 0.00 GB

#
```

**Step 3.** To modify a cell's use-on-next-boot and failure usage attribute settings, use the `parmodify -p# -m#...` command and specify the cell's new settings.

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Specify both the `-p` (partition number) and `-m` (modify cell) options when using `parmodify`. The following example modifies cell 2 to not be used the next time its partition (partition number 0) boots.

```
# parmodify -p0 -m2:base:n:ri
Command succeeded.
#
```

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The `parmodify` command's `-m` option is as follows:

`-m` *cell*`:[`*cell_type*`]:[`*use_on_next_boot*`]:[`*failure_usage*`]`

This option specifies the cell ID (*cell*) whose settings are modified using the following arguments.

- The only valid *cell_type* value is `base` (base cell).
- The valid *use_on_next_boot* values for cells are:

  | | |
  |---|---|
  | `y` | Participate in reboot (the default). |
  | `n` | Do not participate in reboot. |

- The only valid *failure_usage* value for cells is `ri` (reactivate and interleave).

For details, see the *parmodify* (1M) manpage.

**Step 4.** If you have modified a cell's attribute settings, for the settings to be used you must reboot the partition to which the cell is assigned.

Rebooting the cell's partition allows the partition to use each cell's new attribute settings.

- If a cell's use-on-next-boot setting is changed from "n" (do not use) to "y" (use), you must perform a reboot for reconfig of the cell's partition by using the `shutdown -R` command.
- Otherwise, if the cell use-on-next-boot settings are only changed from "y" to "n" then you can perform a standard reboot using the `shutdown -r` command.

**Partition Manager**

This procedure (**Partition —> Modify Partition** action, **Change Cell Attributes** tab) lists and sets the configurable cell attributes using Partition Manager.

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**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

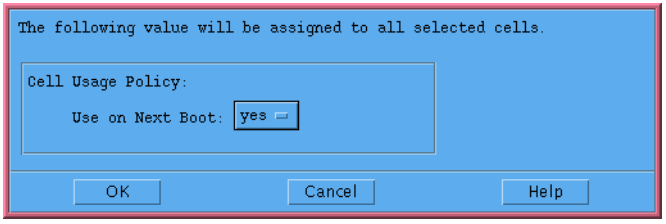
**Step 2.** In the Partition Manager primary window, select the nPartition whose cell attributes you want to change.

Click the partition's name in the list on the left side of the primary window to select the nPartition.

**Step 3.** Select the **Partition —> Modify Partition** action, and click the **Change Cell Attributes** tab.

**Step 4.** Highlight the cell whose attributes you want to modify, click the **Modify Cell** button, and configure the cell attributes as desired.

You can modify the settings for multiple cells at once by selecting all desired cells (press **Control** while clicking on the cells) before clicking the **Modify Cell** button.




Configure the cell attributes in the window, and then click **OK** to apply the modified attributes or **Cancel** to cancel any changes.

**Step 5.** If you have modified any cell attributes, when you return to the **Change Cell Attributes** tab you can click **OK** to apply the changes or click **Cancel** to cancel them.

Review any Notes and Warnings that Partition Manager presents, then click **OK** to proceed or **Cancel** to cancel the changes.

If the cell attribute changes are implemented, Partition Manager presents a final confirmation that the partition was successfully modified.

**Step 6.** If you have modified a cell's attribute settings, for the settings to be used you must reboot the partition to which the cell is assigned.

Rebooting the cell's partition allows the partition to use each cell's new attribute settings.

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- If a cell's use-on-next-boot setting is changed from "no" (do not use) to "yes" (use), you must perform a reboot for reconfig of the cell's partition by using the `shutdown -R` command.
- Otherwise, if the cell use-on-next-boot settings are only changed from "yes" to "no" then you can perform a standard reboot using the `shutdown -r` command.

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# Setting and Checking nPartition Core Cell Choices

The **core cell choice** settings for an nPartition are optional preferences that establish which cells in the partition are preferred to be selected as the core cell for the partition.

You can list and set an nPartition's core cell choices by using these methods:

- *BCH* on page 242

  *This procedure (Configuration menu, COC command) sets the core cell choices for an nPartition using the partition's BCH interface.*

- *HP-UX Commands* on page 242

  *This procedure (parstatus and parmodify commands) lists and sets the core cell choices for an nPartition using HP-UX commands.*

- *Partition Manager* on page 244

  *This procedure (Partition —> Modify Partition action, Cell Cell Choices tab) sets the core cell choices for an nPartition using Partition Manager.*

**NOTE** You do not need to specify core cell choices for a valid core cell to be chosen. By default, system firmware selects the lowest numbered eligible cell as an nPartition's active core cell.

**NOTE** You can specify only *core-capable* cells as core cell choices. A cell must have an I/O chassis with core I/O attached in order to be eligible as a core cell choice.

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### BCH

This procedure (Configuration menu, **COC** command) sets the core cell choices for an nPartition using the partition's BCH interface.

**Step 1.** Access the BCH menu for the nPartition whose core cell choices you wish to set.

**Step 2.** Access the BCH Configuration menu for the partition.

From the BCH Main menu, enter **CO** to enter the Configuration menu.

**Step 3.** Issue the **COC** command to check current core cell choice preferences.

Entering COC with no arguments lists all core cell choice preferences.

**Step 4.** Issue the **COC** command *with arguments* to set or change the nPartition's core cell choice preferences.

The COC command syntax is: COC *choice cell*, where *choice* is 0–3 (with 0 being the highest-priority choice) and where *cell* is the cell ID.

For example, **COC 0 2** sets the most preferred core cell choice to be cell ID 2. Likewise, **COC 1 4** sets the next (second-highest priority) core preference to be cell ID 4.

Use the HELP COC command for other details about the COC command.

**Step 5.** (Optional.) If you have changed the setting for the highest-priority core cell choice (choice 0) and you want the cell you have specified to become the active core cell, then issue the BCH menu's REBOOT command.

This step is optional.

Even if you do not perform this step, the new core cell choice settings will be used the next time the nPartition is rebooted.

### HP-UX Commands

This procedure (**parstatus** and **parmodify** commands) lists and sets the core cell choices for an nPartition using HP-UX commands.

**Step 1.** Issue the **parstatus -V -p#** command to list the nPartition's current core cell choices and core cell use.

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The `parstatus -V -p#` command list detailed status, including the current active core cell (“Core Cell”), and any core cell choice settings (the “Core Cell Alternate” listings, if any).

```
# parstatus -V -p0
[Partition]
Partition Number       : 0
Partition Name         : jules00
Status                 : active
IP address             : 0.0.0.0
Primary Boot Path      : 0/0/2/0/0.13.0
Alternate Boot Path    : 0/0/2/0/0.0.0
HA Alternate Boot Path : 0/0/2/0/0.14.0
PDC Revision           : 6.0
IODCH Version          : 23664
CPU Speed              : 552 MHz
Core Cell              : cab0,cell0
Core Cell Alternate [1]: cab0,cell0
Core Cell Alternate [2]: cab0,cell2

                                  Core Connected  Par
Hardware Location   Usage         IO   To         Num
=================== ============ ==== ========== ===
cab0,bay0,chassis1  active       yes  cab0,cell0 0
cab0,bay1,chassis3  active       yes  cab0,cell2 0

#
```

The core cell choice preferences are listed by `parstatus` as the “Core Cell Alternate” settings with “1” being the highest priority and “2” through “4” as the lower priority core cell choices.

The `parstatus` core cell choice listings (1 through 4) directly correspond to the BCH core cell choice listings (0 through 3).

**Step 2.** Modify the nPartition’s core cell choices using the **`parmodify -p# -r#...`** command.

You can modify the core cell choices for the local partition or any remote partition in the server complex.

Use the following command: `parmodify -p# -r# -r#...`

Specify the partition number (`-p#`) and the cell ID (`-r#`) for all cells you wish to designate as core cell choices.

```
# parmodify -p0 -r2 -r0
Command succeeded.
#
```

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The order in which you list the cells is the order in which the nPartition's core cell choices are established; the first cell listed is the first preferred core cell (choice 1), and the subsequent cells are lower-priority core cell choices (choices 2 through 4, if specified).

**Step 3.** (Optional.) If you wish to immediately use the new core cell choice settings, reboot the nPartition whose core cell choices you have changed.

This step is optional. Even if you do not reboot now, the new core cell choices will be used the next time the nPartition is rebooted.

You can issue the `shutdown` command with the `-r` option to reboot the partition and use the new core cell choice settings. (You *do not* need to perform a reboot for reconfig of the partition.)

If you have modified an *inactive remote* partition, use the service processor Command menu's `BO` command to boot the remote partition; the designated core cell choices will be used to select the active core cell.

**Partition Manager**

This procedure (**Partition —> Modify Partition** action, **Cell Cell Choices** tab) sets the core cell choices for an nPartition using Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** In the Partition Manager primary window, select the nPartition whose core cell choices you want to change.

Click the partition's name in the list on the left side of the primary window to select the nPartition.

**Step 3.** Select the **Partition —> Modify Partition** action, and click the **Cell Cell Choices** tab.

**Step 4.** Modify the core choice setting for each cell whose core choice priority you want to revise.

Highlight the cell whose core cell choice you want to configure, select the desired choice priority (1st, 2nd, none, etc.) from the Core Cell Choice pop-up list, and click the **Modify** button to modify the priority.

**Step 5.** Click the **OK** button when done changing the core choice priorities (or click **Cancel** to not revise any priorities).

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Review any Notes and Warnings that Partition Manager presents, then click **OK** to proceed or **Cancel** to cancel the changes.

If the cell choice priority changes are implemented, Partition Manager presents a final confirmation that the partition was successfully modified.

The new core cell choice priorities will be used the next time the nPartition is rebooted.

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# Moving a Cell to a Different nPartition

To move a cell from one nPartition to another nPartition in the same server complex, use the high-level procedure described here.

This high-level procedure involves:

1. Removing (unassigning) the cell from its original nPartition.
2. Performing a reboot for reconfig (`shutdown -R`) of the original nPartition, if needed.
3. Adding (assigning) the cell to the new partition.
4. Performing a reboot for reconfig (`shutdown -R`) of the cell's new nPartition.

Be aware that this procedure modifies the hardware configurations of both nPartitions involved.

You should *adhere to the hardware requirements and performance guidelines* when removing the cell from its original partition *and* when adding it to its new partition.

When you remove a cell from a partition, any I/O connected to the cell also is removed from the partition. As a result, any I/O devices associated with the cell are made unavailable to the partition.

**CAUTION**

Moving a cell that has an attached I/O chassis from one nPartition to another is effectively the same as moving the associated I/O devices from one computer to another.

All precautions you would take when moving I/O devices from one computer to another must be taken in this situation.

For example, LVM volume groups that are being moved from one nPartition to another must be exported from their original partition *before the cell or I/O chassis is moved*. (For details see the *vgexport* (1M) manpage and *Managing Systems and Workgroups*.)

**Procedure**

The following high-level procedure moves a cell to a different nPartition.

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You can perform these steps using either HP-UX commands or Partition Manager.

**Step 1.** Refer to the procedure *Removing Cells from an nPartition* to remove the cell that you want to move to the other nPartition.

As part of this step you perform a reboot for reconfig (`shutdown -R`) of the nPartition to which the cell is originally assigned.

As a result of this step, the cell is unassigned (on the "free cell list" of available resources) so is is available to be assigned to the other nPartition in the next step.

**Step 2.** Refer to the procedure *Adding Cells to an nPartition* to assign the cell you made available in *Step 1* to its new nPartition.

This step also requires that you perform a reboot for reconfig (`shutdown -R`) of the nPartition to which the cell is being added.

Following the reboot for reconfig, the cell is available (assigned and active) in the new location.

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# Restoring a Complex Profile

You can restore a previous Complex Profile configuration, which effectively allows you to undo your last nPartition configuration change.

Restoring the previous Complex Profile allows you to revert to the previous complex configuration—including the nPartition configurations—that existed before you made your last change.

Because restoring a prior Complex Profile requires shutting down all partitions to an inactive ready for reconfig state, you should use this procedure only when absolutely necessary.

**Service Processor (GSP or MP)**

This procedure (Command menu, **CC** command, **L** option) restores the prior complex configuration that existed before you made your last partition configuration change.

**Step 1.** Ensure that all nPartitions within the server complex are inactive at a ready for reconfig state.

You can put each nPartition into a ready for reconfig state by using the `shutdown -R -H` command, the BCH interface's `RECONFIGRESET` command, or using the service processor Command menu's `RR` command.

**Step 2.** Log in to the server complex's service processor, and enter **CM** to access the Command menu.

Log in as a user with administrator privileges, which are required for restoring the previous complex profile configuration.

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**Step 3.** Issue the **CC** command, select Last Complex Profile (**L**), and confirm that you want to modify the Complex Profile configuration.

```
GSP:CM> CC

This command allows you to change the complex profile.

WARNING: You must either shut down the OSs for reconfiguration or
         execute the RR (reset for reconfiguration) command for all
         partitions before executing this command.

    G - Build genesis complex profile
    L - Restore last complex profile
        Select profile to build or restore: L

    Do you want to modify the complex profile? (Y/[N]) y

    -> The complex profile will be modified.
GSP:CM>
```

**Step 4.** Confirm that the nPartition cell assignments are what you intended to establish.

Use the service processor Command menu's **CP** command to display the current complex profile configuration.

```
GSP:CM> CP

--------+--------------------------------------------------------------------------
Cabinet |   0    |   1    |   2    |   3    |   4    |   5    |   6    |   7
--------+--------+--------+--------+--------+--------+--------+--------+--------
 Slot   |01234567|01234567|01234567|01234567|01234567|01234567|01234567|01234567
--------+--------+--------+--------+--------+--------+--------+--------+--------
 PD  0  |X.X.....|........|........|........|........|........|........|........
 PD  1  |....X.X.|........|........|........|........|........|........|........
 PD  2  |X.X.....|........|........|........|........|........|........|........
 PD  3  |....X.X.|........|........|........|........|........|........|........

GSP:CM>
```

If the partition cell assignments are not what you intended—that is, if you prefer the partition configuration you had before you restored the existing partition configuration—you can repeat this procedure to restore the configuration you had before beginning the procedure.

One level of undo is provided by the service processor Command menu's CC command. This allows you to undo your last partition change, and undo your undo.

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**Step 5.** Issue the **BO** command to boot any nPartitions you want to make active.

After you use the CC command, all partitions still are in a boot-is-blocked ready for reconfig state and thus are *inactive* nPartitions.

You can use the Command menu's BO command to boot the partitions past boot-is-blocked to make the partitions active.

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# 7 Listing and Managing Server Hardware

This chapter covers the tools and methods for listing details about the hardware assigned to nPartitions. This chapter also covers getting information about server hardware, and managing the hardware resources in nPartitions and their server complexes.

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# Tools for Listing and Managing Hardware

You can use several software tools to list server hardware details and manage the hardware in a server complex. These tools have features that overlap for some tasks, but each tool also has unique features.

The tools for listing and managing system hardware are:

- **Service Processor (GSP or MP) menus**

  Service processor menus provide a complex-wide service interface that can allow access to all hardware and partitions.

**NOTE**

The service processor in HP servers is sometimes called the Management Processor (MP) and sometimes the Guardian Service Processor (GSP).

Regardless of the name, the service processor in these servers provides approximately the same features and performs essentially the same role.

Throughout this document the term “service processor” refers to both the MP and GSP service processors.

  Hardware management features include the service processor Command menu’s `DU`, `ID`, `PE`, `PS`, and `SYSREV` commands.

- **Boot Console Handler (BCH) interfaces**

  The BCH interface is the method for interacting with a partition before it has booted HP-UX.

  Hardware management features include the BCH interface’s Configuration menu, Interface menu, and Service menu.

- **HP-UX Commands**

  HP-UX commands allow you to manage and monitor partitions and hardware within a server complex from HP-UX running on any of the server’s partitions.

  Hardware management features include the `parstatus`, `frupower`, `fruled`, and `rad` commands, among many others.

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- **Partition Manager** ( `/opt/parmgr/bin/parmgr`)

  Partition Manager provides a graphical interface for managing and monitoring partitions and hardware within a server complex.

  Hardware management features include menus and windows that list details about cells, I/O chassis, and PCI I/O card slots in the server complex.

- **System Administration Manager** (SAM, `/usr/sbin/sam`)

  The SAM graphical interface (GUI) provides an alternate way to launch Partition Manager as a SAM area.

  SAM also provides a Peripheral Devices area, which has a Cards subarea that is the recommended method for managing PCI I/O cards and PCI slots.

  The **Peripheral Devices —> Cards** area includes error checking and resource analysis not available from the HP-UX command line.

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# Powering Server Cabinets On and Off

You can power on and power off the cabinets within a server complex either by using the main power switch on the front of the cabinet, or by using the service processor Command menu.

You can perform this procedure using the following methods:

- *Cabinet Power Switch* on page 255

  *This procedure (Virtual Front Panel, and using the cabinet power switch) turns a cabinet's 48-volt power on or off using cabinet hardware.*

- *Service Processor (GSP or MP)* on page 256

  *This procedure (Virtual Front Panel, and Command menu's PE command) turns a cabinet's 48-volt power on or off using the service processor.*

When powering off a cabinet, you turn off 48-volt power to the cabinet thus causing all cells and all I/O chassis to power off, and causing most fans to turn off.

**CAUTION**

When you power on or off HP Superdome 64-way compute cabinets, you must power off and power on cabinet 0 and cabinet 1 in such a way that *both cabinets are off* for an overlapping interval.

If either Superdome 64-way cabinet is powered off then powered on while the other cabinet remains on, then communications between the two cabinets is lost.

**CAUTION**

Before powering off system hardware, you first must check whether it is being used.

The cabinet power switch and the service processor Command menu's PE command *do not check* whether system hardware is in use before powering it off.

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Changes in cabinet power status *do not* affect the standby power that supplies system utilities such as the service processor (GSP or MP) and keeps some fans running. These utilities and fans can receive power as long as standby power is enabled.

The way in which standby power is enabled and disabled differs for various HP server models. On HP Superdome servers, standby cabinet power is switched using the power breakers on the rear of the cabinet. On HP rp8400 servers, standby power is enabled through the power cords connecting to the inputs on the rear of the cabinet.

### Cabinet Power Switch

This procedure (Virtual Front Panel, and using the cabinet power switch) turns a cabinet's 48-volt power on or off using cabinet hardware.

**Step 1.** Log in to the system's service processor and access the Virtual Front Panel for the system.

From the service processor Main menu, enter **VFP** to access the Virtual Front Panel menu, then enter **S** to access the "system VFP" that displays the current status for all partitions.

**Step 2.** Check the VFP status to see whether any cabinet hardware is running HP-UX.

Any nPartition whose state is "HP-UX heartbeat" is running HP-UX and thus should not have its hardware powered off until after HP-UX is shut down.

Type **^b** (**Control-b**) to exit the VFP.

**Step 3.** Shut down HP-UX running on any cabinet hardware that you plan to power off.

**Step 4.** Confirm that nobody else is using or servicing the cabinet hardware you plan to power on or off.

You should both physically inspect the hardware, and check whether others are remotely accessing the system's service processor (using the Command menu's **WHO** command).

**Step 5.** Access the cabinet hardware and flip the power switch (located on the cabinet's front) to the on or off position in order to power the cabinet on or off.

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### Service Processor (GSP or MP)

This procedure (Virtual Front Panel, and Command menu's **PE** command) turns a cabinet's 48-volt power on or off using the service processor.

**Step 1.** Log in to the system's service processor and access the Virtual Front Panel for the system.

From the service processor Main menu, enter **VFP** to access the Virtual Front Panel menu, then enter **S** to access the "system VFP" that displays the current status for all partitions.

**Step 2.** Check the VFP status to see whether any cabinet hardware is running HP-UX.

Any nPartition whose state is "HP-UX heartbeat" is running HP-UX and thus should not have its hardware powered off until after HP-UX is shut down.

**Step 3.** Shut down HP-UX running on any cabinet hardware that you plan to power off.

**Step 4.** Confirm that nobody else is using or servicing the cabinet hardware you plan to power on or off.

You should both physically inspect the hardware, and check whether others are remotely accessing the system's service processor (using the Command menu's **WHO** command).

**Step 5.** Access the system's service processor Command menu, issue the **PE** command, then select the cabinet to power on or power off.

From the service processor Main menu, enter **CM** to access the Command menu. To exit the Command menu enter **MA**.

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When using the PE command enter **B** to power on or off a cabinet; specify the cabinet number; and then enter **ON** (power on), **OFF** (power off), or **Q** (quit without changing the power status).

```
GSP:CM> PE

This command controls power enable to a hardware device.

    B - Cabinet
    C - Cell
    I - IO Chassis
        Select Device: b

    Enter cabinet number: 1

    The power state is ON for Cabinet 1.
    In what state do you want the power? (ON/OFF)
```

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# Powering Cells and I/O Chassis On and Off

This section covers *cell* and *I/O chassis* power management procedures, which allow you to control power for cells and I/O chassis from remote locations, without physically accessing the system hardware.

You can perform these procedures using the following methods:

- *Service Processor (GSP or MP)* on page 259

  *This procedure (Command menu, PE command) powers on and powers off cells, I/O chassis, and cabinets using the service processor interface.*

- *HP-UX Commands* on page 260

  *This procedure (frupower -o -c# and frupower -f -c# commands) powers on and powers off cells (and their associated I/O chassis) using HP-UX.*

- *Partition Manager* on page 261

  *This procedure (Cell —> Power On Cell menu, or Cell —> Power Off Cell menu) powers on and powers off cells (and their associated I/O chassis) using Partition Manager.*

**NOTE**

On HP nPartition systems, *powering on* a cell also powers on any I/O chassis attached to the cell, and *powering off* a cell also powers off any I/O chassis attached to the cell.

Powering on or off an I/O chassis connected to a powered-on cell *causes the cell to reset* if the cell located and mapped the I/O chassis during its cell boot process.

The `frupower` command and Partition Manager permit you to power on or off *inactive* cells and I/O chassis that are assigned to the current partition or are not assigned to any partition.

The service processor Command menu's `PE` command permits you to power on or off any hardware in the complex, including active cells and

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I/O chassis. The PE command does not check the current usage of components.

**Service Processor (GSP or MP)**

This procedure (Command menu, **PE** command) powers on and powers off cells, I/O chassis, and cabinets using the service processor interface.

**CAUTION**

When using the service processor Command menu's PE command to power on or off hardware, you should be certain to *correctly specify which component* to power on or off.

The PE command *does not check* whether the hardware is actively being used.

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You can manage the power for all components within the system complex using the service processor Command menu's PE command, regardless of any partition assignment or the status (active or inactive) for the hardware components.

**Step 1.** Log in to the system's service processor and access the Command menu.

From the service processor Main menu, enter **CM** to access the Command menu. To exit the Command menu enter **MA**.

**Step 2.** Issue the **PE** command and specify the type of hardware whose power you want to turn on or turn off.

You can manage power to cells, I/O chassis, and cabinets.

**Step 3.** Specify the hardware device to power on or power off.

The service processor *does not check* whether the specified component is currently being used.

- **Cabinets**—When you power on or off a cabinet, the firmware also powers on or off all cells and I/O chassis in the cabinet.
- **Cells**—When you power on or off a cell, the firmware also powers on or off any I/O chassis attached to the cell.

  When specifying a cell, you indicate both the *cabinet number* and the *slot* in which the cell resides.

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- **I/O Chassis**—When you power off an I/O chassis from the service processor Command menu, the system firmware *resets the cell* attached to the I/O chassis (if the cell located and mapped the I/O chassis during its cell boot process).

  When specifying an I/O chassis, you indicate the cabinet, bay, and chassis numbers to identify it.

In the following example the service processor powers off cell 2 in cabinet 0.

```
GSP:CM> PE

This command controls power enable to a hardware device.

    B - Cabinet
    C - Cell
    I - IO Chassis
        Select Device: c

    Enter cabinet number: 0
    Enter slot number: 2

    The power is ON for the Cell in Cabinet 0, Slot 2.
    In what state do you want the power for the
    Cell in Cabinet 0, Slot 2? (ON/OFF) OFF


GSP:CM>
```

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**HP-UX Commands** This procedure (**`frupower -o -c#`** and **`frupower -f -c#`** commands) powers on and powers off cells (and their associated I/O chassis) using HP-UX.

**NOTE** You can use the `frupower` command to power on or off *inactive cells* that are either assigned to the local partition or are not assigned to a partition.

You cannot power off active cells or power on or off cells assigned to a remote partition when using `frupower`.

To power on or off an I/O chassis using `frupower`, do so by power cycling the cell to which it is connected.

**Step 1.** Log in to HP-UX running on one of the system's partitions.

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To manage a cell's power you must log in to the partition to which the cell is assigned. If the cell is not assigned to a partition, you can manage its power from *any* partition.

**Step 2.** Use the `frupower` command to turn on or turn off the cell's power.

Specify the **`frupower -f -c#`** command to *power off* a cell. (`-c#`). This also powers off any I/O chassis connected to the cell.

Specify the **`frupower -o -c#`** command to *power on* a cell (`-c#`). This also powers on any I/O chassis connected to the cell.

The example that follows shows several sample `frupower` commands and their results.

```
# frupower -f -c0
Error: Can not power off active cell 0.
# frupower -f -c2
# frupower -o -c2
# frupower -f -c6
Error: Cell 6 belongs to partition 1.  Can not power off cell.
#
# frupower -f -i0/1/1
Error: I/O chassis 0/1/1 is attached to a powered-on free cell 4.  Please power
off the free cell.
#
```

In the above example, cell 0 is active and thus cannot be powered off using `frupower`. Cell 2 is inactive and is powered off (`frupower -f -c2`) and then powered back on (`frupower -o -c2`). Cell 6 is assigned to a remote partition (partition number 1) and thus cannot be powered off. I/O chassis 0/1/1 is attached to cell 4, so to power it off cell 4 must be powered off.

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**Partition Manager**

This procedure (**Cell —> Power On Cell** menu, or **Cell —> Power Off Cell** menu) powers on and powers off cells (and their associated I/O chassis) using Partition Manager.

**NOTE**

You can use Partition Manager to power on or off *inactive cells* that are assigned to the local partition.

You cannot power off active cells or power on or off cells assigned to a remote partition when using Partition Manager.

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To power on or off an I/O chassis using Partition Manager, do so by power cycling the cell to which it is connected.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** Select the partition that contains the cell you want to power on or off.

Partitions are listed on the left side of the Partition Manager primary window.

The cells and I/O chassis assigned to the partition are listed on the right side of the primary window once the partition is selected.

**Step 3.** Select the cell whose power you want to turn on or off.

**Step 4.** Select the **Cell —> Power On Cell** menu item, or select the **Cell —> Power Off Cell** menu item.

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# Determining Hardware Power Status

You can use system software to check power status for the following components from remote locations:

- Cabinets
- Bulk Power Supplies and Power Boards
- Cell Boards
- I/O Chassis
- Individual PCI Slots

**NOTE** Cabinet power details and power supply details are specific to each server model. For example, HP Superdome servers and HP rp8400 server have different power configurations and requirements.

You can perform these procedures using the following methods:

- *Service Processor (GSP or MP)* on page 264

  *This procedure (Command menu, PS command) checks power status for cabinets, bulk power supplies and power boards, cells, and core I/O using the service processor.*

- *HP-UX Commands* on page 265

  *This procedure (parstatus -B, parstatus -V -b#, frupower -d -C, frupower -d -I, or rad -q) checks the power status for system hardware from HP-UX.*

- *Partition Manager* on page 268

  *This procedure (Complex —> Show Complex Details menu) lists system hardware power status using Partition Manager.*

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**Service Processor (GSP or MP)**

This procedure (Command menu, **PS** command) checks power status for cabinets, bulk power supplies and power boards, cells, and core I/O using the service processor.

**Step 1.** Log in to the system's service processor and enter **CM** to access the Command menu.

**Step 2.** Issue the service processor Command menu's **PS** command.

The PS command can list detailed information—including power status—for components within the system complex.

The PS command summarizes all cabinets, cells, and core I/O cards, and prompts you to specify which hardware device you want information about.

```
GSP:CM> PS

This command displays detailed power and hardware configuration status.

The following GSP bus devices were found:
+----+----+-----------+----------------+-----------------------------------+
|    |    |           |                |              Core IOs             |
|    |    |           |                | IO Bay | IO Bay | IO Bay | IO Bay |
|    |    |   UGUY    |     Cells      |   0    |   1    |   2    |   3    |
|Cab.|    |           |                |IO Chas.|IO Chas.|IO Chas.|IO Chas.|
| #  | GSP| CLU | PM  |0 1 2 3 4 5 6 7 |0 1 2 3 |0 1 2 3 |0 1 2 3 |0 1 2 3 |
+----+----+-----+-----+----------------+--------+--------+--------+--------+
|  0 |  * |  *  |  *  |* * * * * * * *|  *   * |        |        |        |
|  1 |    |  *  |  *  |* * * * * * * *|  *   * |        |        |        |
|  8 |    |  *  |  *  |                |  *   * |  *   * |        |        |
You may display detailed power and hardware status for the following items:

    B - Cabinet (UGUY)
    C - Cell
    G - GSP
    I - Core IO
        Select Device:
```

**Step 3.** Specify the cabinet whose hardware and power status you want to check.

For each cabinet (B), the PS command reports detailed information that includes the power status for *all components* within the cabinet, including:

- **Cabinet Power**—Whether the 48-volt cabinet power switch is on or off, whether cabinet power is enabled, and details about power boards and bulk power supplies.
- **Cell Power**—Whether power is enabled and on for all cells within the cabinet.

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- **Core I/O Card Power**—Whether power is enabled and on for all core I/O cards within the cabinet.

For system complexes that have multiple cabinets, you must check details for each cabinet separately.

You also can use the PS command to check individual cell (C) or core I/O (I) hardware and power status.

The following example shows cabinet power details for cabinet 0 of an SD64000 model Superdome server.

```
Select Device: b

   Enter cabinet number: 0

HW status for SD64000 compute cabinet #0: NO FAILURE DETECTED
Power switch: on;  Power: enabled, good;  Door: closed
Fan speed: normal;  Temperature state: normal
Redundancy state: fans or blowers redundant, BPSs redundant

                    | Main BP|                  |    IO Backplanes    |
                    | Power  |                  | IO Bay 0 | IO Bay 1 |
              | Main  | Boards |      Cells       | Chassis  | Chassis  |
              | BP    | 0 1 2  | 0 1 2 3 4 5 6 7  | 0 1 2 3  | 0 1 2 3  |
+-------------+-------+--------+------------------+----------+----------+
 Populated    |   *   | * * *  | * * * * * * * *  |   *   *  |          |
 Power Enabled|   *   | * * *  | * * * * * * * *  |   *   *  |          |
 Powered On   |   *   | * * *  | * * * * * * * *  |   *   *  |          |
 Power Fault  |       |        |                  |          |          |
 Attention LED|       |        | *                |   *      |          |

                          | Cabinet |    IO     |
              |    BPS     | Blowers |   Fans    |
              | 0 1 2 3 4 5| 0 1 2 3 | 0 1 2 3 4 |
+-------------+------------+---------+-----------+
  Populated  | * * * * *  | * * * * | * * * * * |
  Failed     |            |         |           |


PM  firmware rev 6.6, time stamp: FRI SEP 08 19:36:47 2000
CLU firmware rev 6.10, time stamp: WED SEP 06 20:56:50 2000

GSP:CM>
```

**HP-UX Commands** This procedure (**`parstatus -B`**, **`parstatus -V -b#`**, **`frupower -d -C`**, **`frupower -d -I`**, or **`rad -q`**) checks the power status for system hardware from HP-UX.

For details on these HP-UX commands, see the online manpages for *parstatus* (1M), *frupower* (1M), and *rad* (1M).

**Step 1.** Log in to HP-UX running on one of the system's partitions.

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To check the power status for PCI card slots, you must log in to the *local partition* where their PCI card cage resides.

You can check the power status for cabinets, cells, and I/O chassis from *any partition*.

**Step 2.** Issue the HP-UX commands to check the power status for the system components of interest to you.

- **Cabinet Power**—Use the **`parstatus -V -b#`** command to check cabinet power status for the specified cabinet (`-b#`), or use the **`parstatus -B`** command for brief power status for all cabinets.

  The `parstatus` command gives details about each cabinet's bulk power supplies and power boards, as well as details about cabinet fans and blowers.

- **Cell Power**—Use the **`frupower -d -C`** command to list cell power status for all cells, or use the **`frupower -d -c#`** command to list power status for a specific cell ( `-c#`).

- **I/O Chassis Power**—Use the **`frupower -d -I`** command for power status for all I/O chassis, or use the use **`frupower -d -i#/#/#`** command to list details for a specific I/O chassis (*cabinet/bay/ chassis*)

- **PCI Card Slot Power**—Use the **`rad -q`** command and option to list details including PCI card slot power for all PCI card slots within the local partition.

  The `rad` command lists information for the local partition only.

The following example output shows power details for an HP Superdome system's cabinet, cells, I/O chassis, and PCI slots, as presented by various HP-UX commands.

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```
# parstatus -V -b0
[Cabinet]
                 Cabinet   I/O       Bulk Power  Backplane
                 Blowers   Fans      Supplies    Power Boards
                 OK/       OK/       OK/         OK/
Cab              Failed/   Failed/   Failed/     Failed/
Num Cabinet Type N Status  N Status  N Status    N Status       GSP
=== ============ ========= ========= ==========  ============   ======
 0  SD32000        4/ 0/ N+  5/ 0/ ?   5/ 0/ N+     3/ 0/ N+      active

Bulk Power Supplies(BPS)
========================
Power Supply  0  ok
Power Supply  1  ok
Power Supply  2  ok
Power Supply  3  ok
Power Supply  4  ok

Backplane Power Boards
======================
Power Supply  0  ok
Power Supply  1  ok
Power Supply  2  ok


Notes: N+ = There are one or more spare items (fans/power supplies).
       N  = The number of items meets but does not exceed the need.
       N- = There are insufficient items to meet the need.
       ?  = The adequacy of the cooling system/power supplies is unknown.
```

**Cabinet Power**

```
# frupower -d -C
Global cell 0, cabinet 0, cell 0 is powered on.
Global cell 2, cabinet 0, cell 2 is powered on.
Global cell 4, cabinet 0, cell 4 is powered on.
Global cell 6, cabinet 0, cell 6 is powered off.
# frupower -d -c4
Global cell 4, cabinet 0, cell 4 is powered on.
```

**Cell Power**

```
# frupower -d -I
Cabinet 0, bay 0, chassis 1 is powered on.
Cabinet 0, bay 0, chassis 3 is powered on.
Cabinet 0, bay 1, chassis 1 is powered off.
Cabinet 0, bay 1, chassis 3 is powered on.
# frupower -d -i0/1/3
Cabinet 0, bay 1, chassis 3 is powered on.
```

**I/O Chassis Power**

```
# rad -q
                                                                  Driver(s)
Slot        Path        Bus   Speed   Power   Occupied   Suspended   Capable
0-0-1-0     0/0/0         0      33      On      Yes          No          No
0-0-1-1     0/0/1/0       8      33      On      No           N/A         N/A
0-0-1-2     0/0/2/0      16      33      On      Yes          No          Yes
0-0-1-3     0/0/3/0      24      33      On      No           N/A         N/A
0-0-1-4     0/0/4/0      32      33      On      No           N/A         N/A
0-0-1-5     0/0/6/0      48      33      On      No           N/A         N/A
0-0-1-6     0/0/14/0    112      33      On      Yes          No          Yes
```

**PCI Slot Power**

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### Partition Manager

This procedure (**Complex —> Show Complex Details** menu) lists system hardware power status using Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** Select the **Complex —> Show Complex Details** menu item.

This displays the Complex Details window, which has tabs providing info for cabinets (the General tab), Cells, and I/O Chassis.

To update the information in the Complex Details window, click the the **Rescan Complex** button.

**Step 3.** Select and view the power status information for the components of interest to you.

- **Cabinet Power**—Click the **Cabinet Info** tab for details on the system complex's cabinet, including cabinet power status.
- **Cell Power**—Click the **Cells** tab for details on cells including their power status.
- **I/O Chassis Power**—Click the **I/O Chassis** tab for details on I/O chassis including their power status.
- **PCI Card Slot Power**—Click the **I/O Chassis** tab, then select the I/O Chassis whose PCI slots you want to list, and then click the **Show Details** button.

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# Turning Attention Indicators (LEDs) On and Off

HP's nPartition systems provide **attention indicators (LEDs)** to help you to visually select and confirm which hardware you want to perform operations on. Attention indicators are amber (orange) lights.

Table 7-1 on page 270 lists attention indicator meanings and LED states (off, blinking, and on). These states and meanings adhere to the PCI Hot-Plug specification.

You can control the attention indicators for various hardware components by using the following methods:

- *HP-UX Commands* on page 271

  *This procedure (fruled -o..., fruled -f..., or rad -f...) manages attention indicators by turning them on, off, or blinking them from HP-UX.*

- *Partition Manager* on page 273

  *This procedure (Cell —> Light Cell LED menu, the I/O —> Light I/O Chassis LED menu, or the I/O —> Light Chassis and Slot LEDs menu) manages a hardware component's attention indicator by blinking it and turning it off from Partition Manager.*

**NOTE**

On HP Superdome servers, the attention indicator behavior has changed since the original HP-UX 11i release.

Starting with the June 2001 HP-UX 11i release, the HP-UX command and utility behavior is to blink attention indicators (rather than light them to a steady-on state, as was the original behavior).

As a result, HP Superdome servers upgrading to the June 2001 or later release will exhibit the new, blinking behavior (see Table 7-1 on page 270) when cell and I/O chassis attention indicators are enabled.

In cases where some nPartitions are running the original HP-UX 11i release and others are running a more recent release, *both behaviors* (the original "steady-on" behavior and the "PCI Hot-Plug" behavior) may be exhibited—possibly within the same server complex.

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Table 7-1 lists the meanings for the various attention indicator states. When all of a system's components are functioning, and no service operations are occurring, every attention indicator should be turned off. (HP Superdome cabinet number LCDs remain lit or blinking when cabinet power is on.)

**Table 7-1 Attention Indicator (LED) States and Meanings**

| Attention Indicator State | Meaning |
|---|---|
| OFF | Not selected. |
| BLINKING | Selected to be used in a service operation. |
| ON | *Supported for PCI card slot LEDs only*.<br>Service required, problems have been identified with the component. |

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You can control (turn off, blink, and/or turn on) attention indicators for the following hardware components:

- **Cells**—Each cell or cell slot has its own attention indicators.
  - — On HP *Superdome servers*, each cell's attention indicator is located on the server cabinet hardware below the cell's slot, just to the right of the cell slot's power LED.
  - — On HP *rp8400 servers*, each cell's attention indicator is located on the cell hardware, to the outside of the cell's power LEDs.
- **I/O Chassis**—On HP *Superdome servers* only, each I/O chassis has a attention indicator, which is located on the cabinet above the I/O chassis.
- **PCI Card Slots**—On *all* HP nPartition systems, each PCI card slot has an attention indicator that you can use to select the card slot. You can view a PCI card slot's attention indicator when accessing the card cage.

  On HP *rp8400 servers* only, you also can view each PCI slot's attention indicator beneath the corresponding slot, on the cabinet's external chassis at the rear of the server cabinet.

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- **Cabinet Number**—On HP *Superdome servers* only, each cabinet has a cabinet number LCD that serves as the cabinet's attention indicator.

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**NOTE**

The **cabinet "attention" light** on HP Superdome and HP rp8400 servers is not user-controllable.

The cabinet "attention" light automatically turns on when one or more alert level 6 (or higher) chassis codes has been recorded in the error logs and has not yet been read. This light automatically turns off when a user enters the service processor (GSP or MP) chassis logs viewer.

**HP-UX Commands**

This procedure (**`fruled -o...`**, **`fruled -f...`**, or **`rad -f...`**) manages attention indicators by turning them on, off, or blinking them from HP-UX.

**Step 1.** Log in to HP-UX running on one of the system's nPartitions.

You can manage cabinet, cell, and I/O chassis attention indicators from HP-UX on *any partition*. To manage PCI slot attention indicators, you must access HP-UX in the *local partition* to which the PCI slot's chassis is assigned.

**Step 2.** Use the `fruled` command or the `rad` command to manage (turn on, off, or blink) the attention indicator for a system hardware component.

From HP-UX you can manage LEDs for the following hardware components:

- **Cells**—Use `fruled` to blink or turn off a cell's attention indicator.

— Turn Off: The **`fruled -f -c#`** command *turns off* the attention indicator for the specified cell (`-c#`). To turn off all cell attention indicators use the **`fruled -f -C`** command.

— Blink: The **`fruled -o -c#`** command *blinks* the attention indicator for the specified cell (`-c#`).

- **I/O Chassis**—Use `fruled` to blink or turn off HP Superdome I/O chassis attention indicators.

  Specify the I/O chassis using *cabinet/bay/chassis* notation (*#/#/#*).

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— Turn Off: The **`fruled -f -i#/#/#`** command *turns off* the attention indicator for the specified I/O chassis (`-i#/#/#`). To turn off all I/O chassis attention indicators use the **`fruled -f -I`** command.

— Blink: The **`fruled -o -i#/#/#`** command *blinks* the attention indicator for the specified I/O chassis (`-i#/#/#`).

- **Cabinet Numbers**—Use `fruled` to blink or not-blink (keep lit) the cabinet number LCD for an HP Superdome cabinet.

— Not-Blink: The **`fruled -f -b#`** command *stops blinking* (keeps it lit) the cabinet number LCD for the specified cabinet (`-b#`).

— Blink: The **`fruled -o -b#`** command *blinks* the cabinet number LED for the specified cabinet (`-b#`).

- **PCI Card Slots**—Use `rad` to turn on, off, or blink the attention indicator for a PCI card slot.

  Specify the PCI slot using *cabinet-bay-chassis-slot* (*#-#-#-#*) notation.

— Turn Off: The **`rad -f off slot`** command *turns off* the attention indicator for the specified PCI card slot (*`slot`*).

— Blink: The **`rad -f attention slot`** command *blinks* the attention indicator for the specified PCI card slot (*`slot`*).

— Turn On: The **`rad -f on slot`** command *turns on* the attention indicator for the specified PCI card slot (*`slot`*).

For details refer to the *fruled* (1) manpage or the *rad* (1M) manpage.

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The following example turns off and blinks various attention indicators on an HP Superdome system, including cell, I/O chassis, PCI slot, and cabinet LEDs.

| | |
|---|---|
| `# fruled -f -C`<br>`# fruled -f -I` | *Turn off* all cell and I/O chassis attention |
| `# fruled -o -c0 -c2 -c4`<br>`# fruled -o -i0/0/1 -i0/0/3`<br>`# fruled -o -b0` | *Blink* attention indicators for cells 0, 2, and 4 and I/O chassis 0/0/1 and 0/0/3. *Blink* the cabinet number LED for |
| `# fruled -f -C`<br>`# fruled -f -I`<br>`# fruled -f -b0` | *Turn off* all cell and I/O chassis attention indicators and *stop blinking* the cabinet number LED. |
| `# rad -f attention 0-0-1-2`<br>`# rad -f off 0-0-1-2`<br>`#` | *Blink* the attention indicator for PCI slot 2 in cabinet 0, bay 0, chassis 1. Then *turn off* the same PCI slot's attention |

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**Partition Manager**

This procedure (**Cell —> Light Cell LED** menu, the **I/O —> Light I/O Chassis LED** menu, or the **I/O —> Light Chassis and Slot LEDs** menu) manages a hardware component's attention indicator by blinking it and turning it off from Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** In Partition Manager's primary window, select the nPartition to which the hardware component (cell, I/O chassis, or PCI slot) is assigned, or select Available Resources if the component is not assigned.

**Step 3.** Select the hardware component whose attention indicator you want to blink, then select the appropriate menu item to blink the LED.

You can manage LEDs for the following hardware components:

- **Cells**—Select the cell in Partition Manager's primary window, then select the **Cell —> Light Cell LED** menu item.

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This menu item *blinks* the selected cell's attention indicator. On HP Superdome servers this *also blinks* the cabinet number LCD for the cabinet in which the cell resides.

- **I/O Chassis**—Select the I/O chassis in Partition Manager's primary window, then select the **I/O —> Light I/O Chassis LED** menu item.

  On HP Superdome servers this menu item *blinks* the attention indicator for the selected I/O chassis, and *also blinks* the cabinet number LCD for the cabinet in which the I/O chassis resides.

- **PCI Card Slots**—Double-click the PCI slot's I/O chassis in Partition Manager's primary window, then select the PCI slot listed in the I/O chassis window, and then select the **I/O —> Light Chassis and Slot LEDs** menu item.

  This menu item blinks the selected PCI card slot's attention indicator.

  On HP Superdome servers, this also blinks the I/O chassis attention indicator and blinks the cabinet number LCD.

**Step 4.** Click the **OK** button in the window to *turn off* the attention indicator for the hardware component you selected.

On HP Superdome servers, this *also turns off* any I/O chassis attention indicator and *stops blinking* any cabinet number LCD changed by this procedure.

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# Listing Cell Processor and Memory Configurations

You can determine the processor and memory configurations for cells in a server complex by using software tools and utilities.

You can perform this procedure using the following methods:

- *Service Processor (GSP or MP)* on page 275

  *This procedure (Command menu, PS command) lists cell processor and memory configurations using the service processor Command menu.*

- *BCH* on page 276

  *This procedure (Information menu, PR and ME commands) lists cell processor and memory configurations from a partition's BCH interface.*

- *HP-UX Commands* on page 279

  *This procedure (parstatus command, with various options) lists cell processor and memory configurations from HP-UX.*

- *Partition Manager* on page 280

  *This procedure (Cell —> Show Cell Details menu, CPUs/Memory tab) lists cell processor and memory details from Partition Manager.*

## Service Processor (GSP or MP)

This procedure (Command menu, **PS** command) lists cell processor and memory configurations using the service processor Command menu.

**Step 1.** Log in to the system's service processor and enter **CM** to access the Command menu.

You can check processor and memory details for any cell in the complex from the service processor.

**Step 2.** Issue the **PS** command and specify the cell whose processor and memory details you want to view.

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The PS command reports details for the cell including its processor configuration (CPU population) and its memory configuration (DIMM population).

For the cell *memory configuration* details, the PS command displays each populated DIMM and identifies it using its rank notation (0A–0D, 1A–1D, and so on).

The following example shows details for cell 0 in cabinet 0, which has four processors (0–3) and four DIMMs installed (0A–0D).

```
GSP:CM> PS

This command displays detailed power and hardware configuration status.


You may display detailed power and hardware status for the following items:

    B - Cabinet (UGUY)
    C - Cell
    G - GSP
    I - Core IO
        Select Device: c

    Enter cabinet number: 0
    Enter slot number: 0

HW status for Cell 0 in cabinet 0: NO FAILURE DETECTED

Power status: on, no fault
Boot is not blocked; PDH memory is shared
Cell Attention LED is off
RIO cable status: connected
RIO cable connection physical location: cabinet 0, IO bay 1, IO chassis 3
Core cell is cabinet 0, cell 0

PDH status LEDs:  ****
                          CPUs
                        0 1 2 3
        Populated       * * * *
        Over temperature

DIMMs populated:
+------ A -----+ +----- B -----+ +----- C -----+ +----- D -----+
0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7
*               *               *               *

PDC firmware rev 10.0
PDH controller firmware rev 7.6, time stamp: TUE MAY 08 20:42:26 2001

GSP:CM>
```

**BCH**

This procedure (Information menu, **PR** and **ME** commands) lists cell processor and memory configurations from a partition's BCH interface.

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Using the BCH interface, you can check these details only for the active cells in the local partition.

**Step 1.** Access the BCH interface for the partition to which the cell is assigned, and access the BCH Information menu.

From the BCH Main menu, enter **IN** to access the BCH Information menu. (If you are not at the BCH Main menu, enter **MA** to go to the Main menu.)

**Step 2.** From the BCH Information menu, list the processor or memory status for all cells by issuing the **PR** and **ME** commands.

- **Processor status**—Use the **PR** command to report details about all processors on all active cells in the partition.
- **Memory status**—Use the **ME** command to report details about all active cells' memory configurations.

  The ME command summarizes memory (DIMM) details for each ranks of memory. Each rank is a set of 4 DIMMs.

These BCH commands do not report details for inactive cells.

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```
Information Menu: Enter command > PR

PROCESSOR INFORMATION

                                                                    Processor
 Cell  Cab/Slot   CPU    Speed     HVERSION   SVERSION   CVERSION     State
 ----  --------   ---   --------   --------   --------   --------   -------------
   4     0/4      0     552 MHz    0x5c70     0x0491     0x0301     Active
                  1     552 MHz    0x5c70     0x0491     0x0301     Idle
                  2     552 MHz    0x5c70     0x0491     0x0301     Idle
                  3     552 MHz    0x5c70     0x0491     0x0301     Idle
   6     0/6      0     552 MHz    0x5c70     0x0491     0x0301     Idle
                  1     552 MHz    0x5c70     0x0491     0x0301     Idle
                  2     552 MHz    0x5c70     0x0491     0x0301     Idle
                  3     552 MHz    0x5c70     0x0491     0x0301     Idle

Information Menu: Enter command > ME

Partition Memory Information

Cell   DIMM Rank 0/1     DIMM Rank 2/3     DIMM Rank 4/5     DIMM Rank 6/7
      Size   Status     Size   Status     Size   Status     Size   Status
---- ------ ---------  ------ ---------  ------ ---------  ------ ---------
  4  2048MB Active       ---               ---               ---
                         ---               ---               ---
  6  2048MB Active       ---               ---               ---
                         ---               ---               ---

      Partition Total Memory:    4096
     Partition Active Memory:    4096
Partition Deconfigured Memory:      0

* status is scheduled to change on next boot.

Information Menu: Enter command >
```

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### HP-UX Commands

This procedure (**parstatus** command, with various options) lists cell processor and memory configurations from HP-UX.

You can check these details for any cell in the complex.

**Step 1.** Log in to HP-UX running on any of the system's partitions.

You can list processor and memory details from any partition.

**Step 2.** Issue the `parstatus` command to view cell hardware details including processor and memory configurations.

Use any of the following `parstatus` commands to view cell hardware information:

- **`parstatus -V -c#`**

  List detailed processor and memory configuration information for the specified cell.

- **`parstatus -C`**

  List brief processor and memory information for all cells in the entire Superdome complex.

- **`parstatus -V -p#`**

  List brief processor and memory information for all cells assigned to the specified partition.

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The following example shows the `parstatus -V -c0` command's output. This presents detailed processor and memory info for cell 0 in cabinet 0.

```
# parstatus -V -c0
[Cell]
Hardware Location       : cab0,cell0
Global Cell Number      : 0
Actual Usage            : active core
Normal Usage            : base
Connected To            : cab0,bay1,chassis3
Core Cell Capable       : yes
Firmware Revision       : 10.0
Failure Usage           : activate
Use On Next Boot        : yes
Partition Number        : 0
Partition Name          : feshd5a

[CPU Details]
Type  : 5C70
Speed : 552 MHz
CPU  Status
===  ======
 0   ok
 1   ok
 2   ok
 3   ok
CPUs
==========
OK     : 4
Deconf : 0
Max    : 4

[Memory Details]
DIMM Size (MB) Status
==== ========= =========
0A   512       ok
0B   512       ok
0C   512       ok
0D   512       ok
Memory
======================
DIMM OK     : 4
DIMM Deconf : 0
Max DIMMs   : 32
Memory OK   : 2.00 GB
Memory Deconf : 0.00 GB

#
```

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### Partition Manager

This procedure (**Cell —> Show Cell Details** menu, **CPUs/Memory** tab) lists cell processor and memory details from Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** On the left of the primary window, select the partition to which the cell is assigned, or select Available Resources if the cell is unassigned.

**Step 3.** On the right of the primary window, select the cell whose processor and memory details you want to list, then select the **Cell —> Show Cell Details** menu item.

**Step 4.** Click the **CPUs/Memory** tab to list the selected cell's processor and memory configurations.

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# Deconfiguring Cells, Processors, and Memory

You can **deconfigure (make inactive) a cell** that is assigned to a partition by setting its use-on-next-boot value to “n” (do not use). This causes the cell to remain assigned to the partition, but the cell will be inactive the next time its partition boots, meaning the cell’s resources will not be used.

You also can **deconfigure processors and memory** from any cell that is assigned to a partition. This causes the deconfigured processors or memory to not be available for use by the cell or its partition.

Whenever you configure or deconfigure cells, processors, or memory, *you must reboot the corresponding partition* for the configuration change to take effect.

You can perform these procedures using the following methods:

- *BCH* on page 281

  *This procedure (Configuration menu CELLCONFIG or CPUCONFIG command, or Service menu DIMMDEALLOC command) configures and deconfigures cells, processors, and memory using the BCH interface.*

- *HP-UX* on page 283

  *This procedure (parmodify -p# -m#::[y|n]:) configures or deconfigures (makes inactive) cells from the HP-UX command line.*

- *Partition Manager* on page 284

  *This procedure (Partition —> Modify Partition menu, Change Cell Attributes tab) configures and deconfigures (makes inactive) cells using Partition Manager.*

## BCH

This procedure (Configuration menu **CELLCONFIG** or **CPUCONFIG** command, or Service menu **DIMMDEALLOC** command) configures and deconfigures cells, processors, and memory using the BCH interface.

**Step 1.** Access the BCH interface for the partition whose cells, processors, or memory you want to configure or deconfigure.

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**Step 2.** To change *cell or processor* configurations access the Configuration menu, or to change *memory* configurations access the Service menu.

To access the Configuration menu enter **CO** at the BCH interface's main menu. To access the Service menu enter **SER**.

**Step 3.** Configure or deconfigure the cell, processors, or memory.

You *cannot* deconfigure the last cell, processor, or DIMM rank. Cells must have at least one configured processor or DIMM rank, and partitions must have at least one configured cell.

- **Cells**

  From the Configuration menu use the CELLCONFIG command to configure or deconfigure a cell in the partition.

  **CELLCONFIG *#* OFF** deconfigures the cell (*#*) by setting its use-on-next-boot value to "n" (do not use).

  **CELLCONFIG *#* ON** configures the specified cell (*#*) by setting its use-on-next-boot value to "y" (use the cell).

  Enter **HELP CELLCONFIG** for details.

- **Processors**

  From the Configuration menu use the CPUCONFIG command to configure or deconfigure a processor on a cell in the partition.

  **CPUCONFIG *cell cpu* OFF** deconfigures the specified processor (*cpu*) on the specified cell (*cell*).

  **CPUCONFIG *cell cpu* ON** configures the specified processor on the cell

  Enter **HELP CPUCONFIG** for details.

- **Memory**

  From the Service menu use the DIMMDEALLOC command to configure or deconfigure memory on a cell in the partition.

  DIMMs operate in ranks of four. Each rank is numbered (0, 1, 2, and so on) and the DIMMs in the rank are lettered (A to D). For example, rank 0 includes DIMMs 0A, 0B, 0C, and 0D.

  When you deallocate a DIMM, *all other DIMMs in the rank also will not be used* the next time the partition boots.

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**DIMMDEALLOC *cell dimm* OFF** deconfigures the specified DIMM (*dimm*) on the cell (*cell*) indicated.

**DIMMDEALLOC *cell dimm* ON** configures the specified DIMM on the cell.

For example, `DIMMDEALLOC 0 1B OFF` sets DIMM 1B on cell 0 to be deallocated the next time the partition boots, and as a result all other DIMMs in the same rank (1A, 1C, and 1D) also will not be used.

Enter **HELP DIMMDEALLOC** for details.

**Step 4.** Reboot the partition using the **REBOOT** command.

Whenever changing cell, processor, or memory configurations you must reboot the corresponding partition to allow the configuration changes to take place.

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**HP-UX**

This procedure (**parmodify -p# -m#::[y|n]:**) configures or deconfigures (makes inactive) cells from the HP-UX command line.

**Step 1.** Log in to HP-UX on the partition whose cell you want to configure or deconfigure.

**Step 2.** Issue the **parstatus -C** command to list all cells, their partition assignments, their actual (current) usage, and their use-on-next-boot values.

**Step 3.** Issue the **parmodify -p# -m#::[y|n]:** command to configure or deconfigure the specified cell (`-m#`) from the partition (`-p#`).

The **parmodify -p# -m#::n:** command deconfigures the specified cell (`-m#`). This sets the cell's use-on-next-boot value to "n" (do not use).

The **parmodify -p# -m#::y:** command configures the specified cell to be used. This sets the cell's use-on-next-boot value to "y" (use the cell).

The partition number (`-p#`) you specify must be the local partition number, which you can list using the `parstatus -w` command.

**Step 4.** Reboot the partition using the **shutdown -R** command.

You must reboot the partition to allow the new use-on-next-boot values to take effect.

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The `shutdown -R` command performs a reboot for reconfig for the partition, which allows *all cells* to reboot, including any currently inactive cells in the partition.

**Partition Manager**

This procedure (**Partition —> Modify Partition** menu, **Change Cell Attributes** tab) configures and deconfigures (makes inactive) cells using Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** Select the partition whose cell configuration you want to modify, then select the **Partition —> Modify Partition** menu item.

**Step 3.** Click the **Change Cell Attributes** tab.

**Step 4.** Select the cell whose configuration you want to modify, then click the **Modify Cell(s)** button.

**Step 5.** In the Modify Cell Attributes window, set the cell's use-on-next-boot value, then click the **OK** button.

To configure the cell to be used set use-on-next-boot to "yes".

To configure the cell *to not* be used set use-on-next-boot to "no".

**Step 6.** Exit Partition Manager, then reboot the corresponding partition using the **`shutdown -R`** command.

You must reboot the partition whose use-on-next-boot cell values you changed to allow the new use-on-next-boot values to take effect.

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# Listing the Server Product Number and Serial Number

You can list the *product number* and the *serial number* for your server complex by using software commands and utilities.

You can perform this procedure using the following methods:

- *Service Processor (GSP or MP)* on page 285

  *This procedure (Command menu, ID command) lists the system complex product number and serial number from the service processor.*

- *HP-UX Commands* on page 286

  *This procedure (parstatus -X) lists a system complex's product number and its serial number from HP-UX.*

- *Partition Manager* on page 287

  *This procedure (Complex —> Show Complex Details menu) lists the system complex's product and serial numbers using Partition Manager.*

### Service Processor (GSP or MP)

This procedure (Command menu, **`ID`** command) lists the system complex product number and serial number from the service processor.

**Step 1.** Log in to the system's service processor and enter **`CM`** to access the Command menu.

**Step 2.** Issue the service processor Command menu's **`ID`** command to display the system complex information, including the product and serial numbers.

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**Step 3.** Type **n** (or type **q**) to *not modify* the system complex information that was displayed.

```
GSP:CM> ID

This command allows you to change certain fields in the Stable complex
configuration portion of the complex profile.

Retrieving the stable complex configuration portion of the complex profile.

    GSP modifiable stable complex configuration data fields.
    Model String           : 9000/800/SD64000
    Complex System Name    : feshd5
    Complex Serial Number  : USR2024FP1
    Original Product Number: A5201A
    Current Product Number : A5201A
    Enterprise Id          :

    Do you want to modify any of this information? (Y/[N]) n

    -> No fields modified.
GSP:CM>
```

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**HP-UX Commands** This procedure (**parstatus -X**) lists a system complex's product number and its serial number from HP-UX.

**Step 1.** Log in to HP-UX running on any of the system's partitions.

You can list the product and serial numbers from any partition.

**Step 2.** Issue the **parstatus -X** command and option to display system complex attributes, including the product and serial numbers.

```
# parstatus -X
[Complex]
   Complex Name : feshd5
   Complex Capacity
     Compute Cabinet (8 cell capable) : 2
     IO Expansion Cabinet             : 1
   Active GSP Location : cabinet 0
   Model : 9000/800/SD64000
   Serial Number : USR2024FP1
   Current Product Number : A5201A
   Original Product Number : A5201A
   Complex Profile Revision : 1.0
   The total number of Partitions Present : 2

#
```

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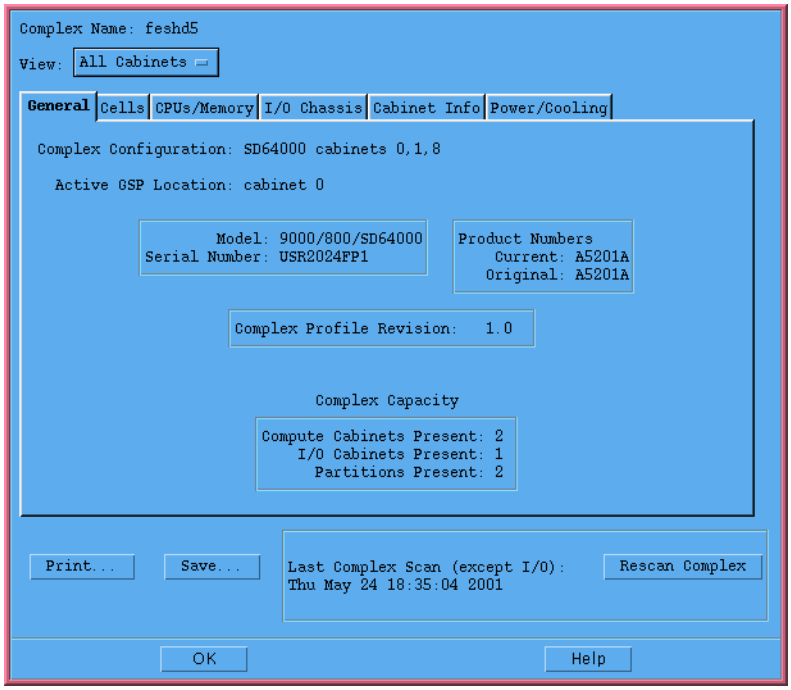
### Partition Manager

This procedure (**Complex —> Show Complex Details** menu) lists the system complex's product and serial numbers using Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** Select the **Complex —> Show Complex Details** menu item.

The Complex Details window displays the complex's product and serial numbers through the **General** tab.



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# Checking Blower and Fan Status

You can remotely check the operating status of a server complex's blowers and fans by using software commands and utilities.

**NOTE** Different HP server and cabinet models have different blower and fan configurations.

You can perform this procedure using the following methods:

- *Service Processor (GSP or MP)* on page 288

  *This procedure (PS command, "Cabinet" option) checks fan and blower status from the service processor Command menu.*

- *HP-UX Commands* on page 289

  *This procedure (parstatus -B or parstatus -V -b#) lists the status of blowers and fans from HP-UX.*

- *Partition Manager* on page 290

  *This procedure (Complex —> Show Complex Details menu, Power/Cooling tab) lists fan status from Partition Manager.*

### Service Processor (GSP or MP)

This procedure (**PS** command, "Cabinet" option) checks fan and blower status from the service processor Command menu.

**Step 1.** Log in to the complex's service processor and enter **CM** to access the Command menu.

**Step 2.** Issue the **PS** command, select the "Cabinet" option, and specify the cabinet number whose fan status you want to check.

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**HP-UX Commands** This procedure (**parstatus -B** or **parstatus -V -b#**) lists the status of blowers and fans from HP-UX.

**Step 1.** Log in to HP-UX running on any of the system's nPartitions.

You can check blower and fan details from HP-UX running on any partition.

**Step 2.** Issue the **parstatus -B** or **parstatus -V -b#** command.

The **parstatus -B** command gives a brief summary of all cabinets including fan status. The **parstatus -V -b#** command gives detailed fan status for cabinet (-b#) that you specify.

```
# parstatus -B
[Cabinet]
                  Cabinet   I/O       Bulk Power  Backplane
                  Blowers   Fans      Supplies    Power Boards
                  OK/       OK/       OK/         OK/
Cab               Failed/   Failed/   Failed/     Failed/
Num Cabinet Type  N Status  N Status  N Status    N Status       GSP
=== ============  ========= ========= ==========  ============   ======
 0  SD64000        4/ 0/ N   4/ 1/ ?   6/ 0/ N+    3/ 0/ N+       active
 1  SD64000        4/ 0/ N+  5/ 0/ ?   6/ 0/ N+    3/ 0/ N+       none
 8  IOX            2/ 0/ N+  4/ 0/ N+  2/ 0/ N+    N/A            none
                              4/ 0/ N+

Notes: N+ = There are one or more spare items (fans/power supplies).
       N  = The number of items meets but does not exceed the need.
       N- = There are insufficient items to meet the need.
       ?  = The adequacy of the cooling system/power supplies is unknown.

# parstatus -V -b0
[Cabinet]
                  Cabinet   I/O       Bulk Power  Backplane
                  Blowers   Fans      Supplies    Power Boards
                  OK/       OK/       OK/         OK/
Cab               Failed/   Failed/   Failed/     Failed/
Num Cabinet Type  N Status  N Status  N Status    N Status       GSP
=== ============  ========= ========= ==========  ============   ======
 0  SD64000        4/ 0/ N   4/ 1/ ?   6/ 0/ N+    3/ 0/ N+       active

Cabinet Blowers
===============
Fan 0  ok
Fan 1  ok
Fan 2  ok
Fan 3  ok

I/O Fans
==============
Fan 0  ok
Fan 1  failed
Fan 2  ok
Fan 3  ok
Fan 4  ok

Bulk Power Supplies(BPS)
========================
Power Supply  0  ok
```

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### Partition Manager

This procedure (**Complex —> Show Complex Details** menu, **Power/Cooling** tab) lists fan status from Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** Select the **Complex —> Show Complex Details** menu item.

This displays the Complex Details window.

**Step 3.** Click the **Power/Cooling** tab to view the panel that has information about the status of the blowers and fans in the complex.

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# Analyzing a Server Complex's Health

You can quickly check for hardware problems in an nPartition server by using Partition Manager's "Analyze Complex Health" feature.

This feature scans the server complex and uses problem detectors to check the operating status of cells, I/O chassis, fans and blowers, and power supplies.

Partition Manager automatically performs this task when you launch the application; if any problems are detected then the complex health analysis is displayed before Partition Manager's primary window.

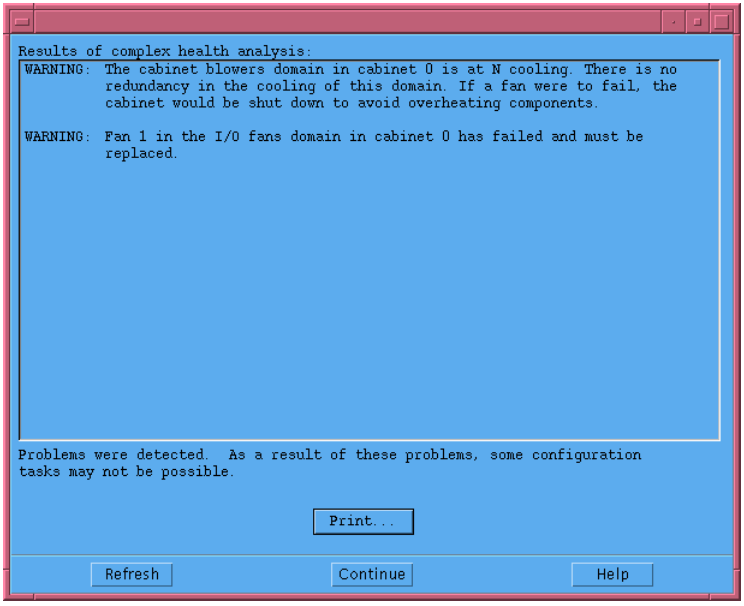
**Partition Manager**

This procedure (**Complex —> Analyze Complex Health** action) quickly checks a server complex's operating status from Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** Select the **Complex —> Analyze Complex Health** action.

Partition Manager displays a window that reports the hardware analysis results. To re-analyze the server's health click the **Refresh** button.


Results of complex health analysis:
WARNING: The cabinet blowers domain in cabinet 0 is at N cooling. There is no redundancy in the cooling of this domain. If a fan were to fail, the cabinet would be shut down to avoid overheating components.
WARNING: Fan 1 in the I/O fans domain in cabinet 0 has failed and must be replaced.
Problems were detected. As a result of these problems, some configuration tasks may not be possible.
Print...
Refresh
Continue
Help

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# Listing the Cabinets in a Server Complex

You can list all cabinets in a server complex by using software commands and utilities, which allow you to determine the complex's cabinet configuration from a remote location.

You can perform this procedure using the following methods:

- *Service Processor (GSP or MP)* on page 292

  *This procedure (Command menu, DU command) lists all cabinets in the server complex using the service processor.*

- *HP-UX Commands* on page 293

  *This procedure (parstatus -B or parstatus -V -b#) lists cabinet details from HP-UX.*

- *Partition Manager* on page 293

  *This procedure (Complex —> Show Complex Details menu, Cabinet Info panel) lists the cabinets in a server complex from Partition Manager.*

### Service Processor (GSP or MP)

This procedure (Command menu, **DU** command) lists all cabinets in the server complex using the service processor.

**Step 1.** Log in to the server's service processor and enter **CM** to access the Command menu.

**Step 2.** Issue the **DU** command to list all cabinets in the server complex.

```
GSP:CM> DU

The following GSP bus devices were found:
+----+-----+-----------+----------------+-----------------------------------+
|    |     |           |                |                Core IOs           |
|    |     |           |                | IO Bay | IO Bay | IO Bay | IO Bay |
|    |     |   UGUY    |     Cells      |    0   |    1   |    2   |   3    |
|Cab.|     |           |                |IO Chas.|IO Chas.|IO Chas.|IO Chas.|
| #  | GSP | CLU | PM  |0 1 2 3 4 5 6 7 |0 1 2 3 |0 1 2 3 |0 1 2 3 |0 1 2 3 |
+----+-----+-----+-----+----------------+--------+--------+--------+--------+
|  0 |  *  |  *  |  *  |*   *   *   *   |      * |      * |        |        |
|  1 |     |  *  |  *  |*   *   *       |        |      * |        |        |
|  8 |     |  *  |  *  |                |      * |  *     |        |        |

GSP:CM>
```

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**HP-UX Commands** This procedure (**`parstatus -B`** or **`parstatus -V -b#`**) lists cabinet details from HP-UX.

**Step 1.** Log in to HP-UX running on any of the server's partitions.

You can list cabinet information from any partition.

**Step 2.** Issue the **`parstatus -B`** command and option to list all cabinets and their current status.

For more information, issue the **`parstatus -V -b#`** command for details on the specified cabinet number (`-b#`).

```
# parstatus -B
[Cabinet]
                  Cabinet   I/O       Bulk Power  Backplane
                  Blowers   Fans      Supplies    Power Boards
                  OK/       OK/       OK/         OK/
Cab               Failed/   Failed/   Failed/     Failed/
Num Cabinet Type  N Status  N Status  N Status    N Status       GSP
=== ============ ========= ========= ==========  ============   ======
 0  SD64000       4/ 0/ N+  5/ 0/ ?   5/ 0/ N+    3/ 0/ N+       active
 1  SD64000       4/ 0/ N+  5/ 0/ ?   5/ 0/ N+    3/ 0/ N+       none

Notes: N+ = There are one or more spare items (fans/power supplies).
        N  = The number of items meets but does not exceed the need.
        N- = There are insufficient items to meet the need.
        ?  = The adequacy of the cooling system/power supplies is unknown.

#
```

**Partition Manager** This procedure (**Complex —> Show Complex Details** menu, **Cabinet Info** panel) lists the cabinets in a server complex from Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** Select the **Complex —> Show Complex Details** menu item, then click the **Cabinet Info** panel.

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# Listing the nPartitions in a Server

You can list details about the nPartitions defined in a server complex, including the partition numbers, partition names, and the cells assigned to the partitions.

You can perform this procedure using the following methods:

- *Service Processor (GSP or MP)* on page 294

  *This procedure (Command menu, CP command) lists all nPartitions using the service processor.*

- *HP-UX Commands* on page 295

  *This procedure (parstatus -P) lists a server's nPartitions from HP-UX.*

- *Partition Manager* on page 295

  *This procedure (viewing the left side of the primary window) displays all nPartitions in the server using Partition Manager.*

## Service Processor (GSP or MP)

This procedure (Command menu, **CP** command) lists all nPartitions using the service processor.

**Step 1.** Log in to the server's service processor and enter **CM** to access the Command menu.

**Step 2.** Issue the service processor Command menu's **CP** command to list all nPartitions defined in the server complex.

The CP command lists the partition number (Part 0, Part 1, and so on) for each partition and lists which cells are assigned to each partition.

```
GSP:CM> CP

--------------
Cabinet | 0  |
--------+----+
 Slot   |0123|
--------+----+
Part  0 |*...|
Part  1 |.*..|

GSP:CM>
```

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### HP-UX Commands

This procedure (**`parstatus -P`**) lists a server's nPartitions from HP-UX.

**Step 1.** Log in to HP-UX running on any of the server's partitions.

You can list all partitions from any partition in the server.

**Step 2.** Issue the **`parstatus -P`** command and option to list all nPartitions and their current status.

```
# parstatus -P
[Partition]
Par             # of  # of I/O
Num Status      Cells Chassis  Core cell  Partition Name (first 30 chars)
=== ========== ===== ======== ========== ==============================
 0  active         2      2     cab0,cell0 jules00
 1  active         2      2     cab0,cell4 jules01
#
```

### Partition Manager

This procedure (viewing the left side of the primary window) displays all nPartitions in the server using Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** Access Partition Manager's primary window, and view the list of nPartitions shown on the window's left side.

Each nPartition is listed separately. Also listed here are the server's Available Resources, which are not assigned to any partition.

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# Naming or Renaming a Server Complex

You can assign a name for each server complex in order to better identify the complex as you work with it.

Several commands and utilities display the server complex name as part of their output and interfaces. For example, some nPartition commands and Partition Manager list the complex name.

The server complex name only serves as a helpful identifier; changing the name does not affect the way in which commands and utilities interact with the complex.

You can perform this procedure using the following methods:

- *Service Processor (GSP or MP)* on page 296

  *This procedure (Command menu, ID command) allows you to list and modify the server complex name from the service processor.*

- *Partition Manager* on page 297

  *This procedure (Complex —> Set Complex Name menu) names or renames a server complex using Partition Manager.*

The server complex name is stored as part of the server's complex profile (part of its "stable complex configuration" data).

**NOTE** Each server complex name has up to 20 characters, which can include upper- and lowercase letters; numbers; and dashes, underscores, periods, and spaces ("-" "_" "." and " ").

### Service Processor (GSP or MP)

This procedure (Command menu, **ID** command) allows you to list and modify the server complex name from the service processor.

**Step 1.** Log in to the server's service processor and enter **CM** to access the Command menu.

**Step 2.** Issue the service processor Command menu's **ID** command to list the complex's name.

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The ID command lists some of the current server complex's "stable complex configuration" data, including the complex name.

```
GSP:CM> ID

This command allows you to change certain fields in the Stable complex
configuration portion of the complex profile.

Retrieving the stable complex configuration portion of the complex profile.

    GSP modifiable stable complex configuration data fields.
    Model String           : 9000/800/SD64000
    Complex System Name    : feshd5
    Complex Serial Number  : USR2024FP1
    Original Product Number: A5201A
    Current Product Number : A5201A
    Enterprise Id          :

    Do you want to modify any of this information? (Y/[N])
```

**Step 3.** Specify whether you want to modify the complex profile, including its name.

You should only modify the "complex system name". Do not change the model string, serial number, or other details used by commands, utilities, and licensing tools.

To cancel the changes at any time, enter **q** to quit the ID command without modifying the complex profile data.

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**Partition Manager**

This procedure (**Complex —> Set Complex Name** menu) names or renames a server complex using Partition Manager.

**Step 1.** Run Partition Manager (/opt/parmgr/bin/parmgr) or access it from SAM or a Web interface.

**Step 2.** Select the **Complex —> Set Complex Name** menu item.

**Step 3.** Enter the complex's new name in the pop-up window.

The pop-up window shows the current complex name. If no name was previously assigned, the default name is "MyComplex".

**Step 4.** Click **OK** to set the new name or click **Cancel** to keep the previously assigned name.

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# Checking for Power Supply Failures

From remote locations you can check the operating status of power supplies by using software commands and utilities.

Different HP server and cabinet models have different supply requirements and configurations.

You can perform this procedure using the following methods:

- *Service Processor (GSP or MP)* on page 298

  *This procedure (Command menu PS command, "Cabinet" option) checks power status from the service processor.*

- *HP-UX Commands* on page 298

  *This procedure (parstatus -B or parstatus -V -b#) lists the status of power supplies from HP-UX.*

- *Partition Manager* on page 299

  *This procedure (Complex —> Show Complex Details menu, Power/Cooling tab) lists power status from Partition Manager.*

### Service Processor (GSP or MP)

This procedure (Command menu **PS** command, "Cabinet" option) checks power status from the service processor.

**Step 1.** Log in to the complex's service processor and enter **CM** to access the Command menu.

**Step 2.** Issue the **PS** command, select the "Cabinet" option, and specify the cabinet number whose power status you want to check.

### HP-UX Commands

This procedure (**parstatus -B** or **parstatus -V -b#**) lists the status of power supplies from HP-UX.

**Step 1.** Log in to HP-UX running on any of the system's nPartitions.

You can check power details from HP-UX running on any partition.

**Step 2.** Issue the **parstatus -B** command for a brief summary of all cabinets including power status, or issue the **parstatus -V -b#** command for

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detailed power status for a specific cabinet (`-b#`) whose details you want to view.

- The `parstatus -B` command summarizes the power status for all cabinets in the system complex.
- The `parstatus -V -b#` command displays a detailed status ("ok" or "failed") for all power supplies in the specified cabinet (`-b#`).

The following example shows power supply details for cabinet number 0, which has one failed bulk power supply.

```
# parstatus -V -b0
[Cabinet]
                    Cabinet   I/O       Bulk Power  Backplane
                    Blowers   Fans      Supplies    Power Boards
                    OK/       OK/       OK/         OK/
Cab                 Failed/   Failed/   Failed/     Failed/
Num Cabinet Type    N Status  N Status  N Status    N Status       GSP
=== ============== ========= ========= ==========  ============   ======
 0  SD32000         4/ 0/ N+  5/ 0/ ?   3/ 1/ N     3/ 0/ N+       active

Cabinet Blowers
===============
Fan 0  ok
Fan 1  ok
Fan 2  ok
Fan 3  ok

I/O Fans
==============
Fan 0  ok
Fan 1  ok
Fan 2  ok
Fan 3  ok
Fan 4  ok

Bulk Power Supplies(BPS)
========================
Power Supply  0  ok
Power Supply  1  ok
Power Supply  3  failed
Power Supply  4  ok

Backplane Power Boards
======================
Power Supply  0  ok
Power Supply  1  ok
Power Supply  2  ok


Notes: N+ = There are one or more spare items (fans/power supplies).
       N  = The number of items meets but does not exceed the need.
       N- = There are insufficient items to meet the need.
       ?  = The adequacy of the cooling system/power supplies is unknown.

#
```

**Partition Manager** This procedure (**Complex —> Show Complex Details** menu, **Power/Cooling** tab) lists power status from Partition Manager.

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**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** Select the **Complex —> Show Complex Details** menu item.

This displays the Complex Details window.

**Step 3.** Click the **Power/Cooling** tab to bring up the panel that contains information about the status of the power supplies in the complex.

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# Checking for Memory DIMM Failures

You can list cell memory configurations and check for memory DIMM failures using software tools and utilities.

You can perform this procedure using the following methods:

- *HP-UX Commands* on page 301

  *This procedure (parstatus -V -c#) lists a cell's memory status, including any DIMM failures, from HP-UX.*

- *Partition Manager* on page 303

  *This procedure (Cell —> Show Cell Details menu, CPUs/Memory tab) lists a cell's memory status, including any DIMM failures, from Partition Manager.*

## HP-UX Commands

This procedure (**`parstatus -V -c#`**) lists a cell's memory status, including any DIMM failures, from HP-UX.

**Step 1.** Log in to HP-UX running on any of the system's partitions.

You can check memory details for any cell from any partition.

**Step 2.** Issue the **`parstatus -V -c#`** command to list detailed information about the specified cell (`-c#`).

The detailed information `parstatus` reports includes a list of all DIMMs (memory modules) installed on the cell, and the status of each DIMM.

Any memory listed as "failed" either has failed self-tests or has been software deconfigured by the Boot Console Handler (BCH) Service menu's DIMMDEALLOC command.

**NOTE**

For any DIMM that fails or is deallocated, *all other DIMMs in the same rank also are deallocated*. All four DIMMs within the same rank must pass self-test and must be allocated for the rank to be made available for use by the cell and its partition.

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In the example that follows, eight DIMMs (0A–0D and 1A–1D) are installed and are available (“ok”) for use by the cell’s partition.

```
# parstatus -V -c0
[Cell]
Hardware Location       : cab0,cell0
Global Cell Number      : 0
Actual Usage            : active core
Normal Usage            : base
Connected To            : cab0,bay0,chassis1

Partition Number        : 0
Partition Name          : Partition 0

[CPU Details]
Type  : 5E70
Speed : 750 MHz
CPU  Status
===  ======
 0   ok
 1   ok
 2   ok
 3   ok
CPUs
==========
OK      : 4
Deconf  : 0
Max     : 4

[Memory Details]
DIMM Size (MB) Status
==== ========= =========
0A   512       ok
0B   512       ok
0C   512       ok
0D   512       ok
1A   512       ok
1B   512       ok
1C   512       ok
1D   512       ok
Memory
=========================
DIMM OK        : 8
DIMM Deconf    : 0
Max DIMMs      : 32
Memory OK      : 4.00 GB
Memory Deconf  : 0.00 GB

#
```

In the above example, if any DIMM had failed its status would be “failed” and all other DIMMs in its rank (for instance, rank 0 or rank 1) also would be listed as failed.

Any one or more of the failed DIMMs might have been software deallocated or might have failed self tests. In either case, all DIMMs in the rank automatically are deallocated when any of the rank’s DIMMs fails or is deallocated.

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**Partition Manager**

This procedure (**Cell —> Show Cell Details** menu, **CPUs/Memory** tab) lists a cell's memory status, including any DIMM failures, from Partition Manager.

**Step 1.** Run Partition Manager (`/opt/parmgr/bin/parmgr`) or access it from SAM or a Web browser.

**Step 2.** On the left of the primary window, select the partition to which the cell is assigned, or select Available Resources if the cell is unassigned.

**Step 3.** On the right of the primary window, select the cell whose memory details you want to list, then select the **Cell —> Show Cell Details** menu item.

**Step 4.** Click the **CPUs/Memory** tab to display the status of memory modules (DIMMs) for the cell.

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# Checking for Processor Failures

You can list cell processor configuration, including any processor failures, using software tools and utilities.

You can perform this procedure using the following methods:

- *HP-UX Commands* on page 304

  *This procedure (parstatus -V -c#) lists a cell's processor status, including any failures, from HP-UX.*

- *Partition Manager* on page 305

  *This procedure (Cell —> Show Cell Details menu, CPUs / Memory tab) lists processor details and any failures using Partition Manager.*

## HP-UX Commands

This procedure (**`parstatus -V -c#`**) lists a cell's processor status, including any failures, from HP-UX.

**Step 1.** Log in to HP-UX running on any of the system's partitions.

You can check processor details for any cell from any partition.

**Step 2.** Issue the **`parstatus -V -c#`** command to list detailed information about the specified cell (`-c#`).

The detailed information `parstatus` reports includes a list of all processors (CPUs) installed on the cell, and the status of each CPU.

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Any processors listed as “failed” either have failed self-tests or have been software deconfigured by the Boot Console Handler (BCH) Configuration menu’s CPUCONFIG command.

```
# parstatus -V -c5
[Cell]
Hardware Location       : cab0,cell5
Global Cell Number      : 5
Actual Usage            : active base
Normal Usage            : base

[CPU Details]
Type  : 23664
Speed : 552 MHz
CPU  Status
===  ======
 0   ok
 1   failed
 2   ok
 3   failed
CPUs
============
OK     : 2
Failed : 2
Max    : 4
```

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**Partition Manager**

This procedure (**Cell —> Show Cell Details** menu, **CPUs/Memory** tab) lists processor details and any failures using Partition Manager.

**Step 1.** Run Partition Manager (/opt/parmgr/bin/parmgr) or access it from SAM or a Web browser.

**Step 2.** On the left of the primary window, select the partition to which the cell is assigned, or select Available Resources if the cell is unassigned.

**Step 3.** On the right of the primary window, select the cell whose processor details you want to list, then select the **Cell —> Show Cell Details** menu item.

**Step 4.** Click the **CPUs/Memory** tab to display the processors installed in the selected cell and list the status for each processor.

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# 8 HP Instant Capacity on Demand (iCOD) for nPartitions

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This chapter covers using Hewlett-Packard's iCOD (Instant Capacity on Demand) product on nPartitions.

iCOD is an *optional* product that enables you to instantly increase or adjust processing power within nPars. As you need more or fewer processors, you use iCOD tools to adjust the number of activated processors in the nPartition.

Two varieties of iCOD software and contracts are available from HP: iCOD Purchase and iCOD Utility (pay per use). Both are described in this chapter.

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# Introduction to iCOD on nPartitions

HP's iCOD product is available for both nPartition servers and non-partitionable HP servers. This document covers iCOD issues that are unique to nPartition systems.

See the *Instant Capacity on Demand (iCOD) and Pay Per Use (PPU) User's Guide* for complete information about iCOD on all supported platforms.

iCOD is an *optional* product that includes an iCOD software bundle and a corresponding system contract with Hewlett-Packard, which determine the type of billing for processors you activate and use.

Billing for iCOD-activated processors is calculated on a complex-wide basis: the total number of activated iCOD processors in all nPars.

HP nPartition systems support two varieties of iCOD: **iCOD Purchase**, which enables you to instantly activate and purchase *additional* processors as your needs increase; and **iCOD Utility**, which supports instantly increasing and decreasing the number of activated processors, for billing on a *pay per use* basis.

All nPars in a server complex either must run the same iCOD variety (purchase or utility) or not run iCOD. If you configure iCOD Utility for one nPar then you also must configure all other nPars with iCOD Utility. HP recommends (but does not require) that you configure iCOD Purchase for all nPars if you configure any nPar with iCOD Purchase.

You cannot configure nPars with both iCOD Utility and iCOD Purchase in the same server complex.

## Unique iCOD Features for nPartitions

HP's iCOD Purchase and iCOD Utility products have some different features and behaviors on nPartition servers than iCOD on other non-partitionable systems.

The following list covers some of these unique features.

- iCOD on each nPar is managed locally and independently.

  iCOD commands affect and list iCOD settings for the *local* nPartition (the nPar where the commands are run).

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While there is one iCOD license for the entire server complex, iCOD processors are activated and deactivated independently for each nPar. Each nPar has its own settings for iCOD contact, notification, and processor configuration purposes.

- Passwords are not required for activating and deactivating iCOD processor on nPartitions.

  On nPar servers under either iCOD contract (iCOD Purchase or iCOD Utility) you can perform all tasks that change the iCOD processor configuration for an nPartition.

  On non-partitionable systems an HP service password is required for some iCOD processor deactivation tasks.

- Both varieties of iCOD support “load balancing” processors across nPartitions in the same server complex.

  When using either iCOD Purchase or iCOD Utility, you can instantly adjust each nPar’s number of activated processors as system loads demand and maintain the same total number of activated processors in the complex.

  For example, you can deactivate processors in one underused nPar and activate the same number of processors in another, more heavily used nPar to load balance using the same number of processors.

  This load balancing does not change any nPar cell assignments. Each nPar keeps the hardware assigned to it while iCOD software in each nPar either activates or deactivates processors.

## New iCOD Issues for Managing nPartitions

iCOD introduces several new issues for managing nPartitions. The following list describes some of these new management issues for nPar systems that have iCOD configured:

- At least one iCOD processor must be activated for each active cell in an nPartition.

  For example, a three-cell nPar with iCOD must have at least three activated iCOD processors, and the iCOD software ensures that each cell has a processor activated.

- The maximum number of activated processors in an nPar is the iCOD “requested active processors” setting.

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However, if the number of active cells is *greater than* the number of "requested active processors" then the iCOD software activates more processors than were requested: one processor is activated for each active cell in the nPar.

- Only processors on active cells can be activated by iCOD.

  Inactive cells in an nPar cannot have processors activated by iCOD in the nPar. To activate processors on inactive cells, you first must make the cells active.

- Activating and deactivating processors can potentially affect software packages that rely on certain processor IDs to be present, such as certain processor set (Pset) configurations. Refer to the chapter on Psets for details.

  Likewise, changing the number of activated processors may have implications for managing software that is licensed on a per-processor basis.

- Adding or removing cells in an nPartition with iCOD does not necessarily increase or decrease the number of activated processors in the nPar.

  The iCOD software activates the requested number of processors for an nPartition as long as the nPar has enough configured processors to satisfy the request.

  Adding a cell to an nPar increases the total processors and the number of configured processors in the nPar. However, if the requested number of processors remains the same for the nPar then the same number of activated iCOD processors are available after performing a reboot for reconfig to make the newly added cell active.

  For example, in a two-cell nPartition that has six of its eight processors activated with iCOD, adding another four-processor cell brings the total processors to 12. However, the iCOD software keeps the number of activated processors at six (no change). (Other of the new cell's resources—such as memory and I/O—are made available for use in the nPartition.)

  Likewise, removing a cell from an nPar reduces the total processors and the number of configured processors in the nPar. If enough processors remain available then the requested number of iCOD processors are activated.

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When not enough processors are configured, the iCOD software activates as many processors as possible and the number of activated processors is less than the number of "requested active processors".

Other sections in this publication provide more iCOD details.

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# Tools for Managing iCOD Processors

The HP Instant Capacity on Demand (iCOD) product includes the following commands for managing iCOD settings and processor configurations. This same set of commands is used for both the iCOD Purchase and iCOD Utility products.

For details on these commands refer to the *icod_modify* (1M), *icod_notify* (1M), and *icod_stat* (1M) manpages.

- `/usr/sbin/icod_modify`

  The `icod_modify` command allows you to activate and deactivate iCOD processors. This command also lets you change system contact information and apply a software license to use iCOD.

  The `-a` option activates processors and `-d` deactivates processors.

- `/usr/sbin/icod_notify`

  The `icod_notify` command allows you to request that an iCOD asset report be delivered by e-mail, and allows you to turn on or off e-mail notification of iCOD configuration changes.

  The `-n` option turns on or off automatic change notification e-mail.

- `/usr/sbin/icod_stat`

  The `icod_stat` command displays iCOD status and configuration information as well as iCOD processor usage details.

  The `-p` option gives complex-wide iCOD Purchase details on nPar systems. The `-u` option displays the iCOD change record, listing the changes from oldest to newest.

When using the iCOD commands to activate and deactivate processors or update contact and notification details, you affect the iCOD configuration and settings for the *local nPartition* only. While some iCOD settings are stored in complex profile data, many iCOD settings are stored on disk in the iCOD configuration file (/etc/.iCOD_data). As a result, you may need to check and adjust iCOD configuration settings when booting from different disks.

When you license iCOD (by using the `icod_modify -l...` command) you can do so from *any nPartition* in the server complex. This licenses

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iCOD for all nPars in the server, and only one license is needed for the entire complex.

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# iCOD Requirements for nPartition Servers

HP's iCOD software has the following requirements and restrictions for using and managing iCOD processors in an nPartition server complex.

- Each nPartition server complex can *optionally* be under either an iCOD Purchase contract or a pay per use (iCOD Utility) contract.

  In a server complex that is under one of these contracts, the appropriate software *must* be installed in the complex's nPars to support the contract.

  HP *does not* support mixing iCOD Purchase and iCOD Utility nPartitions in the same server complex.

- nPartition servers that are under an iCOD Utility contract (a pay per use "PPU" contract) are *required* to have iCOD Utility software installed and running on *every* HP-UX instance in the complex.

  In other words, each nPartition in the complex must have the iCOD Utility software installed on all potential boot disks for the nPar.

**NOTE** Where multiple devices are configured for an nPar (for example, the PRI, HAA, and ALT boot paths), each device must have iCOD Utility software installed.

- Each nPartition that is under an iCOD Purchase contract *must have* iCOD Purchase software installed to enable additional processors to be activated (or to deactivate processors).

  In an iCOD Purchase complex, you *do not* have to install iCOD Purchase software on the nPars that are *not* under an iCOD Purchase contract. However, in this situation HP recommends that all nPars have iCOD Purchase software installed to allow administrators to perform "load balancing" across nPars should the need to do so arise.

**NOTE** All potential boot disks for nPars with iCOD processors must have the iCOD Purchase software installed, including any alternate boot devices.

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- Only *configured* processors on *active* cells that are *assigned* to an nPartition can be activated by iCOD software.

  Processors that are deconfigured cannot be activated by iCOD; they first must be configured (for example, by using the BCH Configuration menu's `CPUCONFIG` command).

  Cells that are inactive cannot have processors activated by iCOD. Each cell first must boot and complete "partition rendezvous" before it can contribute resources to the nPar to which it is assigned.

  Likewise, cells that are unassigned cannot have processors activated by iCOD. Each cell must be assigned to an nPar and must be an active member of its nPar before its resources can be used.

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# Installing and Configuring iCOD on nPartitions

**NOTE**

This section describes iCOD software install and configuration for an nPartition server complex.

You also must establish a contract with HP for either iCOD Purchase or iCOD Utility (pay per use) to properly use this software product.

Software bundles for iCOD Purchase and iCOD Utility are available on the Support Plus media and at the **`http://software.hp.com`** Web site.

For complete details on installing and using iCOD software, refer to the *Instant Capacity on Demand (iCOD) and Pay Per Use (PPU) User's Guide*.

The following procedure gives an overview of initially installing and configuring iCOD Purchase or iCOD Utility on an nPartition server complex.

**Step 1.** Install the appropriate iCOD software bundle on all required nPars in the server complex.

On nPartition server complexes that have iCOD Purchase contracts, you must install the iCOD Purchase software on those nPars in the complex that have iCOD processors. (For greater flexibility in load balancing iCOD processors HP recommends installing iCOD Purchase software on all nPars.)

On nPartition servers that have iCOD Utility (pay per use) contracts, you must install the iCOD Utility software on *every* nPar in the complex.

If you expect to boot an nPar from different devices—even on rare occasions—you must install the appropriate iCOD software bundle on all potential boot devices (such as the devices at the PRI, HAA, and ALT boot paths).

**Step 2.** [*An HP service representative must perform this step*.]

Validate the server complex as an iCOD server.

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**Step 3.** Configure `sendmail` so that it can send e-mail to an HP mail server that is outside of your company's firewall.

HP iCOD software sends encrypted e-mail from the local nPar running iCOD to HP for billing purposes and to request licensing information. Details on `sendmail` configuration are in the user's guide for iCOD.

You must configure `sendmail` on all nPars that have iCOD software installed. On nPars with multiple boot devices, configure `sendmail` for each boot device.

**Step 4.** Configure the iCOD contact information for each nPar that has iCOD software installed, using the `icod_modify -c...` command.

This specifies the person who will receive iCOD licensing e-mail from HP and iCOD configuration change notices. For example:

```
# icod_modify -c "Joe Doe":joe@company.com:555-5555
```

On nPars with multiple boot devices, configure the the iCOD contact information for each boot device, in case alternate devices (such as HAA or ALT) are booted.

**Step 5.** [*This step needs to be performed only once for the entire server complex*.]

Request a license by issuing the `icod_notify` command (with no options) in any nPar that has iCOD, `sendmail`, and the contact information configured.

The `icod_notify` command sends an iCOD asset report to HP and to the iCOD contact and `root` for the nPar. After HP receives the asset report a confirmation e-mail, which contains the iCOD license key, is sent to the iCOD contact.

Apply the license for iCOD by issuing the `icod_modify -l...` command. For example:

```
# icod_modify -l AABBCCDD
```

where *AABBCCDD* is the iCOD license key given in the confirmation e-mail. You only need to apply the iCOD license once for the entire server complex.

**Step 6.** Use iCOD features: list iCOD statistics with `icod_stat` and, when required, activate or deactivate processors.

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To list iCOD configuration details for the local nPartition, use the `icod_stat` command (with no options).

For an nPar complex that has iCOD Purchase configured for multiple nPars, you also can use the `icod_stat -p` command to display iCOD processor usage statistics for all nPars in the server complex. (The `-p` option does not give more information for iCOD Utility configurations or for non-nPar configurations.)

See the iCOD user's guide or other sections in this publication for details on changing iCOD processor configurations on nPartitions.

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# Procedures for Changing iCOD Configurations on nPartitions

This section covers the following procedures for changing the iCOD configuration on nPartitions. These procedures apply for both iCOD Purchase and iCOD Utility software and contracts.

- *Activating and Deactivating Processors with iCOD* on page 320

  *This procedure (using the icod_modify -a... or icod_modify -d... command) activates or deactivates processors in an nPar with iCOD.*

- *Setting the Total Number of Requested Active Processors with iCOD* on page 321

  *This procedure (using the icod_modify -s... command) sets the total number of requested active processors for an nPar with iCOD.*

- *Load Balancing Processors across nPartitions with iCOD* on page 322

  *This procedure (using both the icod_modify -d... and icod_modify -a... commands) adjusts the balance of activated processors across two nPars in the same server complex: deactivate processors in one nPar and activate the same number of processors in another nPar.*

- *Changing the Type of iCOD Contract for an nPar Server Complex* on page 323

  *This procedure describes how to change your existing iCOD contract to either iCOD Purchase or iCOD Utility by contacting HP sales or support representatives.*

- *Removing iCOD Software and Functionality from nPars* on page 324

  *This procedure describes how to remove iCOD software and functionality from an nPar server complex after completing your iCOD purchasing and contract obligations.*

**NOTE**

The following nPartition changes also can cause iCOD software to activate a different number or set of the nPar's processors: adding and removing cells from an nPar, making cells active or inactive, or configuring or deconfiguring processors from cells in the nPar.

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### Activating and Deactivating Processors with iCOD

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This procedure (using the **`icod_modify -a...`** or **`icod_modify -d...`** command) activates or deactivates processors in an nPar with iCOD.

**NOTE**

Activating or deactivating processors can affect your billing for iCOD services.

On systems with HP processor set (Pset) software installed: *newly activated* processors are assigned to the default Pset, and deactivated processors are removed from the Pset to which they were assigned.

HP's iCOD software selects processors for activation or deactivation by following the appropriate processor installation order for the machine type. The iCOD utilities select processors based on their *physical location* in the server (not their HP-UX CPU IDs).

For example, on HP Superdome servers the processor install order for each cell is: first processor slot 0, then slots 3, 1, and 2.

As a result, all active cells in a Superdome nPar always have processor 0 activated because a minimum of one processor must be activated per cell. Then, as needed to meet the iCOD "requested active processors" number for the nPar, each cell's "processor 3" slot is activated, then each cell's "processor 1" slot, and finally the "processor 2" slots.

**Step 1.** Login to the nPar in which you will be activating or deactivating processors.

You can activate or deactivate processors in only the *local* nPartition (the nPar in which you issue the `icod_modify` command).

**Step 2.** Issue the `icod_modify` command with either the `-a #` option (to activate # processors) or `-d #` option (to deactivate # processors).

You must include the following details after the `-a` or `-d` option. This information is recorded in the nPar's iCOD change log.

[*description*]:*user_name*:*mgr_name*:*mgr_email*:*mgr_phone*

These details provide an optional description of the change, the name of the user/person making the change, and the authorizing manager, manager's e-mail address, and manager's phone number.

For example, to activate two processors (`-a 2`):

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```
# icod_modify -a 2 "two CPUs added":Ann:Joe:jdoe@comp.com:555-5555
```

In the next example, one processor is deactivated (`-d 1`):

```
# icod_modify -d 1 "one less CPU":Ann:Joe:jdoe@comp.com:555-5555
```

See also the *icod_modify* (1M) manpage for details.

**Step 3.** As desired, issue the `icod_stat` command to list the new processor configuration details for the local nPartition.

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### Setting the Total Number of Requested Active Processors with iCOD

This procedure (using the **`icod_modify -s...`** command) sets the total number of requested active processors for an nPar with iCOD.

Performing this procedure can increase or decrease the number of activated processors in an nPar.

**NOTE**

Activating or deactivating processors can affect your billing for iCOD services.

On systems with HP processor set (Pset) software installed: *newly activated* processors are assigned to the default Pset, and deactivated processors are removed from the Pset to which they were assigned.

**Step 1.** Login to the nPar in which you will be activating or deactivating processors.

You can activate or deactivate processors in only the *local* nPartition (the nPar in which you issue the `icod_modify` command).

**Step 2.** Issue the `icod_modify -s...` command and specify the number of processors to be activated.

You must include the following details after the `-s` option. This information is recorded in the nPar's iCOD change log.

[*description*]:*user_name*:*mgr_name*:*mgr_email*:*mgr_phone*

For example, the following command sets the number of "requested active processors" to 10, which may increase or decrease the number of

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activated processors in the nPar (depending on the number of processors available before the command is issued).

```
# icod_modify -s 10 "activate 10 CPUs total":Ann:Joe:jdoe@comp.com:555-5555
```

See also the *icod_modify* (1M) manpage for details.

**Step 3.** As desired, issue the `icod_stat` command to list the new processor configuration details for the local nPartition.

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### Load Balancing Processors across nPartitions with iCOD

This procedure (using both the **`icod_modify -d...`** and **`icod_modify -a...`** commands) adjusts the balance of activated processors across two nPars in the same server complex: deactivate processors in one nPar and activate the same number of processors in another nPar.

**NOTE**

After "load balancing" processors across nPartitions, each nPar still has the same cells and processors assigned to it.

However, this procedure reduces the number of activated processors in the first nPar and increases (by the same amount) the number of activated processors in the second nPartition.

This procedure does not affect your billing for iCOD services *if*: the total number of activated processors in the complex does not change *and* the operations are not performed by HP service representatives.

Both nPartitions must have iCOD software installed and configured.

Also, both nPartitions must have enough activated or deactivated processors to accommodate the reduction or increase in processors.

**Step 1.** Login to the first nPartition and deactivate the number of processors you plan to activate in the second nPar.

Refer to the procedure *Activating and Deactivating Processors with iCOD* on page 320, and use the `icod_modify -d...` command to deactivate the processors.

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If HP processor set (Pset) software is installed, deactivating processors removes the corresponding CPU IDs from the Pset to which they were assigned.

**Step 2.** Login to the second nPartition and activate the same number of processors you deactivated in the previous step.

Refer to the procedure *Activating and Deactivating Processors with iCOD* on page 320 and use the `icod_modify -a...` command to activate the processors.

If HP processor set (Pset) software is installed, the newly activated processors are assigned to the local nPar's default Pset.

### Changing the Type of iCOD Contract for an nPar Server Complex

This procedure describes how to change your existing iCOD contract to either iCOD Purchase or iCOD Utility by contacting HP sales or support representatives.

Changing the type of iCOD contract for a server complex will affect your billing for iCOD services.

**Step 1.** Contact your HP sales or support representatives and request an iCOD contract and software change.

Changing the type of iCOD contract and software will require that an HP service representative alter the iCOD software configuration for all nPartitions affected by the change.

For nPars that have multiple boot devices (such as PRI, HAA, and ALT), HP iCOD software bundles on every boot device must be updated.

**Step 2.** Consider any software licensing issues or nPartition system configuration issues that you must address when changing from iCOD Purchase to iCOD Utility (pay per use) or vice versa.

For example, some nPars may have different sets of processors activated as a result of the change. Or, in the case of a pay per use (iCOD Utility) contract, the set of activated processors in each nPar may change on an ongoing basis.

Such changes could potentially affect HP processor set (Pset) configurations, or the configuration of HP Process Resource Manager (PRM) or HP Workload Manager (WLM) software.

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### Removing iCOD Software and Functionality from nPars

This procedure describes how to remove iCOD software and functionality from an nPar server complex after completing your iCOD purchasing and contract obligations.

For more details see the *Instant Capacity on Demand (iCOD) and Pay Per Use (PPU) User's Guide*.

**Step 1.** Confirm that all processors in all nPartitions in the server complex are activated and purchased.

All processors in the complex are activated when: for every nPar the "requested active processors" equals the "total processors". You can check this by issuing the `icod_stat` command in each nPar.

If you have a server complex that is under an iCOD Purchase contract, you also must have paid the enablement fee for all processors. Confirm this with your HP sales or service representative.

If your server complex is under an iCOD Utility (pay per use) contract, you must check with your HP sales or service representative to determine if you have met all contract requirements.

**Step 2.** After confirming with HP that you have completed all requirements, use the `swremove` command to uninstall the iCOD Purchase or iCOD Utility bundle.

You must remove the bundle from every nPar that no longer is under contract. In the case of iCOD Utility contracts this involves removing the bundles from all nPars.

On nPars where iCOD software is installed on multiple boot devices (such as PRI, HAA, and ALT) you should remove the bundle from all devices.

See the iCOD *User's Guide* and the *swlist* (1M) and *swremove* (1M) manpages for details.

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# Managing iCOD Utility (Pay Per Use) on nPartitions

This section describes several methods of managing processor resources for a server complex that is under a pay per use (iCOD Utility) contract.

If your server complex is under an iCOD Utility contract then you are billed for *all activated* processors in the whole nPar server complex.

The pay per use iCOD Utility contract enables you to manage processor resources in the complex in such a way that you only pay for the amount of processor resources that you actually require.

When you have processors in an nPar complex that you do not need, you can exclude those processors from billing by *deactivating* processors, by making processors *inactive*, or by *deconfiguring* processors.

These three methods of excluding processors from pay per use billing are discussed here. See the *Deactivated Processors*, *Inactive Processors*, and *Deconfigured Processors* sections that follow.

### Tips for Pay Per Use Processor Management

- The recommended method for activating and deactivating processors on nPars is to use the `icod_modify` command. This command instantly increases or decreases the number of available processor resources in the nPar without requiring a reboot.

  For example, if an nPar is underused—as when most of the nPar's processors are constantly idle—you could deactivate unneeded processors by using the `icod_modify -d...` command.

- When an entire nPartition in a complex is unused you can exclude that nPar's processors from billing by making the nPar inactive.

  For example, if an nPartition is not running HP-UX but is "just sitting at the BCH interface" you could reset the nPar to a ready for reconfig state by using the BCH `RECONFIGRESET` command to make the nPar inactive. (When an nPar is running HP-UX, using the `shutdown -R -H` command makes the nPar inactive.)

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When an nPar is inactive all its cells and processors are inactive and cannot be used until the nPar is booted (using the GSP or MP Command menu's `BO` command).

- Individual cells that are *inactive* are not billed for iCOD Utility purposes, because all processors on inactive cells also are inactive.

  This includes unassigned cells, as well as cells that have not participated in "partition rendezvous" for their assigned nPar (for example: newly added cells or cells that had a "n" use-on-next-boot value when the partition last booted).

**Deactivated Processors**

A **deactivated processor** is one that has been "turned off" by the nPar's iCOD software, perhaps as a result of the `icod_modify -d...` command. Deactivated processors can be activated instantly by using the `icod_modify -a...` command.

The iCOD software selects which processors are activated and deactivated and chooses processors based on their physical locations.

For details refer to the procedure for activating and deactivating iCOD processors.

**Inactive Processors**

An **inactive processor** is a processor that is in an inactive cell and thus is at a boot is blocked (BIB) state.

The following examples describe situations where both cells and processors are inactive (and thus are not subject to iCOD Utility billing):

- All processors on a cell that is not assigned to an nPar are inactive.
- All processors on a cell that did not participate in "partition rendezvous" for its nPar are inactive.

  You can make a cell inactive either by unassigning it from an nPar, or by setting the cell's use-on-next-boot value to "n" (meaning: do not use the cell) and rebooting the cell's nPartition.

- All processors on cells that are assigned to an inactive nPar are inactive.

  You can make all processors in an nPartition inactive by resetting the nPar to a ready for reconfig state. In an inactive nPar, all cells are inactive and thus all processors on cells in the nPartition are inactive.

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To put an nPar in an inactive, ready for reconfig state: if HP-UX is running use the `shutdown -R -H` command, or if at the Boot Console Handler (BCH) interface use the `RECONFIGRESET` command.

*None* of an inactive cell's resources (processors, memory, or any I/O connected to the cell) are available for use in an nPartition. For the cell's processors and other hardware resources to be used, the cell must be *assigned* and *active* in an nPartition.

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### Deconfigured Processors

A **deconfigured processor** is a processor that has been made unavailable for use by its nPartition through settings enabled by Boot Console Handler (BCH) menu commands.

You can deconfigure processors using the BCH Configuration menu's `CPUCONFIG` command. Also use this command to configure processors that have been deconfigured.

Using BCH commands to configure and deconfigure processors requires rebooting the nPar in which the processors reside. For this reason deconfiguring processors is *not the recommended method* of making processors inactive for iCOD purposes.

Instead, the recommended method is to deactivate processors using the `icod_modify -d...` HP-UX command, which can instantly make processors deactivated and activated without rebooting.

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# 9 Processor Sets (Psets) on nPartitions

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This chapter describes how to use and manage processor sets (Psets) on nPartition systems.

Using Psets, you can create multiple independent processor groups in an nPar. Each Pset has its own processors and attributes. Because Psets are dynamic, you can create, modify, and destroy Psets instantly as your system needs demand.

HP's processor set software is an *optional* package that is free for all HP-UX 11i systems and is available at the **`http://software.hp.com`** Web site.

The same Pset features are available on all HP-UX 11i systems, including both non-partitionable systems and nPartitions servers.

On nPartition servers, however, you should be aware of the nPar system configuration issues that can affect your use of processor sets. This chapter covers special configuration issues for Psets in nPar environments.

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# Introduction to Psets

HP's processor set (Pset) product is an optional software package that runs on any HP-UX 11i system, including all nPartition servers. The Pset software package is free and is available from the **`http://software.hp.com`** Web site.

Each processor set (Pset) is a group of active processors that functions as an independent *scheduling allocation domain*. When the Pset software is installed, you can establish multiple Psets in a single HP-UX system.

By dividing the active processors in an nPar into multiple Psets, you can provide processor resource isolation for applications that run in each Pset. Each application only has access to the processors assigned to the Pset in which it runs.

You can dynamically create and reconfigure Psets using the `psrset` command or HP's Process Resource Manager (PRM). You also can launch each thread or process to run in a specific Pset and can manually migrate threads and processes to different Psets while they run.

## Thread and Process Pset Bindings

In systems where Pset software is installed, every thread and process is bound to only one Pset at a time.

Applications are not migrated to different Psets unless you have configured PRM to do so, or if you manually bind a process to a different Pset using the `psrset` command.

HP-UX load balancing occurs within each Pset. Because load balancing does not occur across Psets, processors in one Pset can potentially be oversubscribed while processors in another Pset are nearly idle. This is an aspect of the processor resource isolation that Psets provide.

Both real-time and time-share schedulers are supported for processor sets and each Pset has its own schedulers. So, for example, real-time processes in one Pset only contend for processors in the Pset in which they are running.

Use of the HP-UX gang scheduler is supported only in the default Pset (processor set ID 0), as of the current Pset software release. See the *gang_sched* (7) manpage or the *mpsched* (1) manpage for details on using gang scheduling.

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### HP-UX Processor Numbering and Availability on nPars

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The HP-UX operating system number processors from 0 to *n*-1, where *n* is the number of configured processors on active cells in an nPartition.

Each physical processor is not necessarily given the same logical HP-UX processor ID each time the nPar is booted. HP-UX processor IDs are assigned on a first-come first-numbered basis. As a result, even if an nPartition's processor configuration does not change, the correlations from physical processors to logical HP-UX processor IDs may change when HP-UX is rebooted in the nPar.

This list gives details on how processors are available and numbered by HP-UX running on nPartitions.

- The following processors are *numbered* and are *available*: processors that are configured, reside on active cells, and (if HP's iCOD software is configured) are activated by iCOD.
- Processors that are *deconfigured* are not available and are not numbered by HP-UX.

  For deconfigured processors to be available they first must be configured using the nPar's Boot Console Handler (BCH) interface.

  For details refer to the procedure for configuring and deconfiguring processors.
- Processors on *inactive cells* are not available and are not numbered by HP-UX. The cells must be active and must have configured processors in order to contribute processors to the nPar.

  Refer to the section on deconfiguring cells, processors, and memory for details.
- Processors that have been *deactivated* by HP's Instant Capacity on Demand (iCOD) software *are* numbered by HP-UX but are not available to be used until they are activated by iCOD.

  This means that when iCOD has deactivated one or more processors, some processors were numbered by are not listed in output displayed by commands such as `mpsched -s`, `top`, or `sar`.

  For example, the `mpsched` output below shows that processors 1, 2, 5, 6 and possibly others are deactivated. (To view more iCOD details use `icod_stat`.) Refer to the sections on iCOD for details.

```
# mpsched -s
System Configuration
====================
```

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```
Locality Domain Count: 1
Processor Count      : 5

Domain    Processors
------    ----------
0         0   3   4   7   8
#
```

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### The System Default Pset

When Pset software is installed, a *system default Pset* always exists that gives all users access to the processors assigned to it. The default Pset is Pset 0, which always has at least processor ID 0 assigned to it.

All processors are initially assigned to the default Pset until you configure processors to belong to other Psets.

When a Pset is destroyed or when a processor is removed from a Pset, the processors involved are assigned back to the default Pset.

### Pset Attributes and Access Permissions

Each Pset has attributes that configure the Pset's behavior in various situations. These attributes also include "owner, group, and others" access permissions similar to traditional HP-UX file permissions. The default Pset's attributes cannot be changed, but all other Psets can have their attributes adjusted as needed.

Users who have write access for a Pset can modify *some* of the Pset's attributes, including attributes other than the access permissions. Each Pset's owner can modify the Pset's access permissions.

The following users can modify *all aspects* of all non-default Psets in a system: `root`, `superuser`, and users who belong to a group that has the `PSET` privileged capability. These users can modify all Pset attributes, modify all Pset processor assignments, and can create and destroy Psets.

The `PSET` privileged capability is established for a group by issuing the `setprivgrp` command. For example, `setprivgrp mygrp PSET` applies this privilege (and no other privileges) to the "mygrp" group. See the *setprivgrp* (1M) manpage for details.

### Pset Boot-Time Configuration

When HP-UX boots on an nPartition that has Pset software installed, by default all processors are assigned to the default Pset: Pset 0.

You can have multiple Psets established at boot time either by creating HP-UX startup scripts that configure Psets, or by configuring Psets through PRM and having PRM establish configurations at boot time.

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### Pset Binding and Inheritance

Child threads and processes inherit the Pset bindings of their parents.

So, for example, when a process creates child processes, the children are are launched into the same Pset as the parent.

By using the Pset programming interface you can have more control over the Pset locations where threads and processes are spawned and run.

### Using PRM on nPars with Psets

The HP Process Resource Manager product enables you to create and manage Psets through its graphical interface.

PRM provides the ability to maintain Pset configurations across system reboots. It also has the ability to assign (isolate) memory to Psets, thus giving Psets memory isolation as well as processor resource isolation.

PRM software refers to Psets using PRM IDs (or names) that it tracks, rather than using Pset IDs. PRM may modify Psets and cause them to be renumbered while managing Psets. Thus, if you use the `psrset -i` command while PRM has configured Psets you may notice this renumbering of Pset IDs.

Note that if you have used PRM to assign specific processor IDs to Psets in the system, all specified processor IDs *must be present* for PRM to be able to load and establish the Pset configurations. Otherwise, when specified processors are not present, PRM cannot create the Psets.

You can help avoid this potential problem by not specifying processor IDs and instead specifying the *number of processors* for PRM to configure in each Pset.

This processor availability issue can prevent PRM from loading Pset configurations when iCOD software in an nPartition has *deactivated* one or more of the specified processors.

PRM also may be prevented from loading Pset configurations when any of the following has occurred in an nPartition: *deconfiguring* processors (at the BCH interface), *unassigning* a cell from an nPar, or making one or more of an nPar's cells *inactive*.

See the PRM online help or user's guide for details on managing PRM. Also refer to the *psrset* (1M) manpage for details on using the `-f` option while PRM is managing Psets.

### Programming Interface for Psets

For details on the Pset programming interface refer to the following HP-UX manpages: *pset_assign* (2), *pset_bind* (2), *pset_create* (2), *pset_ctl* (2), *pset_destroy* (2), *pset_getattr* (2), *pset_setattr* (2).

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# Table of Pset Management Tasks

This section lists only the `psrset` command-line procedures for managing Psets. Common Pset tasks are given in Table 9-1.

Also see the *psrset* (1M) manpage for details, or refer to the section with Pset examples for command output and examples. For details on support for Psets in HP Process Resource Manager (PRM) refer to the *HP Process Resource Manager User's Guide* or the PRM online help.

**Table 9-1 Processor Set (Pset) Management Tasks**

| Task | Commands |
|---|---|
| Listing Pset configurations | **`/usr/sbin/psrset -i`**<br>This lists all Psets defined in the system including the processors assigned to each and the owner, access permissions, and attributes for the Psets. |
| Creating a new Pset | **`/usr/sbin/psrset -c [`*`processor_list`*`]`**<br>where *`processor_list`* is an optional list of processors that are assigned to the newly created Pset. |
| Destroying (deleting) a Pset | **`/usr/sbin/psrset -d [`*`pset_list`*` \| all]`**<br>where you specify either `all` (to delete all Psets) or a list of the Psets to be deleted (*`pset_list`*).<br>When you delete a Pset, the Pset's ID no longer exists and all processors assigned to the Pset are assigned to the default Pset. Deleting all Psets (`psrset -d all`) causes all processors to be assigned to the default Pset (Pset ID 0), which then is the only Pset in the system.<br>The user issuing this command must have write permission for the Psets that are deleted. |

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**Table 9-1 Processor Set (Pset) Management Tasks**

| Task | Commands |
|---|---|
| Assigning (reassigning) processors to Psets | **`/usr/sbin/psrset -a`** ***`pset_id processor_list`***<br>where *`pset_id`* is the Pset to which the processors specified in *`processor_list`* are assigned.<br>The user issuing this command must have write permission for both the Pset specified by *`pset_id`* and the Pset(s) to which the processors in *`processor_list`* are assigned. |
| Unassigning (removing) processors from Psets | **`/usr/sbin/psrset -r`** ***`processor_list`***<br>where *`processor_list`* is the list of processors that will be removed from their current Psets and assigned to the default Pset.<br>The user issuing this command must have write permission for the Pset(s) to which the processors in *`processor_list`* are assigned. |
| Configuring Pset attribute values | **`/usr/sbin/psrset -t`** ***`pset_id attr_name=attr_value`***<br>where *`pset_id`* is the Pset whose attribute(s) will be configured; each attribute (*`attr_name`*) is set to the corresponding value (*`attr_value`*) specified. Attributes include `OWNID`, `GRPID`, `PERM`, and others listed in the *psrset* (1M) manpage.<br>**`/usr/sbin/psrset [-n \| -F]`** ***`pset_id`***<br>where *`pset_id`* is the Pset for which external I/O interrupts are either enabled (`-n`) or disabled (`-F`).<br>When configuring attributes other than access permissions, the user issuing these commands must have write permission for the Psets specified.<br>To configure access permissions (`OWNID`, `GRPID`, `PERM`) you must have `root` or `superuser` access or membership in a group that has `PSET` privileged capabilities.<br>You cannot modify attributes for Pset ID 0. |

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**Table 9-1 Processor Set (Pset) Management Tasks**

| Task | Commands |
|---|---|
| Setting Pset access permissions | Use the `psrset` command's `-t` option, as described in *Configuring Pset attribute values* in this table.<br><br>To configure access permissions (`OWNID`, `GRPID`, `PERM`) you must have `root` or `superuser` access or membership in a group that has `PSET` privileged capabilities.<br><br>Specify the `PERM` attribute and corresponding value to set access permissions.<br><br>**`/usr/sbin/psrset -t` *`pset_id`* `PERM=`*`p1p2p3`***<br><br>where *`pset_id`* is the Pset and *`p1p2p3`* is the set of access permissions for the Pset owner (*`p1`*), Pset group (*`p2`*), and others (*`p3`*).<br><br>Each access permission (owner, group, and others) is a number from 0–7 to indicate execute (x), write (w), and/or read (r) permissions.<br><br>`0`=no permissions, `1`=x, `2`=w, `3`=xw, `4`=r, `5`=xr, `6`=wr, `7`=xwr<br><br>Execute allows running programs in the Pset, write allows changing the Pset configuration, and read allows reading the Pset configuration.<br><br>For example "PERM=754" gives the Pset owner execute, write, and read permissions; gives members of the Pset's group execute and read permissions; and gives other users only read permission.<br><br>You also can specify attributes and values to change the owner (`OWNID`) and group (`GRPID`) for the Pset. |
| Running programs in a Pset | **`/usr/sbin/psrset -e` *`pset_id command`* `[`*`arguments`*`]`**<br><br>where *`pset_id`* is the Pset in which the specified *`command`* will be executed. As needed, specify *`arguments`* to list any command-line options or arguments for the command.<br><br>The user issuing this command must have execute permission for the Pset in which the command is run. |

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**Table 9-1 Processor Set (Pset) Management Tasks**

| Task | Commands |
|---|---|
| Binding threads and processes to a Pset | **/usr/sbin/psrset -b *pset_id pid_list***<br>where *pset_id* is the Pset in which the specified process IDs (*pid_list*) will be bound.<br>The user issuing this command must have execute permission for both the original and new Psets in which the process ID executes. |
| Listing Pset bindings for a process | **/usr/sbin/psrset -q *pid_list***<br>where *pid_list* is the list of process IDs whose processor set bindings are listed.<br>Each process ID is bound to one Pset in the system. |

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# Tools for Managing and Using Psets

This section lists several tools for managing Psets.

For details refer to these manpages: *psrset* (1M), *xprm* (1), *prmconfig* (1), *mpsched* (1), *rtsched* (1), *sar* (1M), *setprivgrp* (1M), and *getprivgrp* (1).

- `/usr/sbin/psrset`

  This command provides the main command-line interface for Psets.

- HP Process Resource Manager (PRM):
  `/opt/prm/bin/xprm` and
  `/opt/prm/bin/prmconfig`

  These commands provide graphical (`xprm`) and command-line (`prmconfig`) interfaces to PRM, which has built-in support for Psets.

- `/usr/bin/mpsched`

  This command provides a method for launching and managing time-share processes and threads, allowing for processor binding and unbinding, enabling gang scheduling, and inquiring about system and process attributes.

- `/usr/bin/rtsched`

  This command provides a method of launching real-time threads and processes.

- `/usr/sbin/sar`

  This command reports system activity, including Pset activity when the `-p` *`pset`* option or `-P` option is specified.

  For example, `sar -u -M -P 5` gives a snapshot of system processor use over a five second period, and because `-P` is specified Pset assignments are included.

- `/usr/sbin/setprivgrp` and
  `/usr/bin/getprivgrp`

  The `setprivgrp` command sets privileged capabilities for a specified group. When issuing this command, you must list all privileged capabilities that are to be applied for the group. For example: `setprivgrp mygrp PSET RTSCHED` grants special Pset and real-time scheduling capabilities to the members of the “mygrp” group.

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To remove privileged capabilities for a group, issue the `setprivgrp` command with no capabilities specified (for example: `setprivgrp mygrp`).

The `getprivgrp` command reports privileged capabilities for the user issuing the command.

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# Examples: Sample Uses of Psets

**NOTE**

These examples show the use of processor sets (Psets) on an HP Superdome server that also has HP Instant Capacity on Demand (iCOD) "pay per use" software installed.

Uses of the optional HP iCOD software commands are noted in the text accompanying the examples.

Refer to the chapter on iCOD for iCOD management information.

The following Pset examples are given in this section.


- *Listing, Creating, and Using Psets* on page 340
- *Destroying a Pset and Reassigning Processors* on page 342
- *Running and Binding Programs in Psets* on page 344
- *Managing Pset Permissions and Attributes* on page 347


**Example 9-1 Listing, Creating, and Using Psets**

Initially this nPartition has only one Pset: the default Pset, which is Pset 0.

```
# psrset -i
PSET        0
SPU_LIST    0    1    2    3    4    5    6    7    8    9    10   11
OWNID       0
GRPID       0
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

#
```

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The icod_modify command sets the total number of processors to four. As the psrset -i command shows, this reduces the number of processors that are available and assigned to Psets. Note that processor IDs (listed in the SPU_LIST) are *not sequentially numbered* because several processors have been deactivated by the iCOD software.

```
# icod_modify -s 4 "set to 4":Ann:Joe:jdoe@comp.com:555-5555

4 processors are now active.

NOTE:    Verify that HP and 3rd party software licenses are upgraded
         to take into account the number of active processors.

# psrset -i
PSET        0
SPU_LIST    0    3    4    8
OWNID       0
GRPID       0
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

#
```

Create a new Pset using processor IDs 4 and 8, using the psrset -c... command. Then list all Psets using the psrset -i command.

```
# psrset -c 4 8
successfully created pset 2
successfully assigned processor 4 to pset 2
successfully assigned processor 8 to pset 2
# psrset -i
PSET        0
SPU_LIST    0    3
OWNID       0
GRPID       0
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

PSET        2
SPU_LIST    4    8
OWNID       0
```

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```
GRPID       3
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

#
```

**Example 9-2 Destroying a Pset and Reassigning Processors**

List the local nPar's Pset configuration using the `psrset -i` command. There are three Psets: the default Pset 0, Pset 10, and Pset 11.

```
# psrset -i
PSET        0
SPU_LIST    0    1    2    3    4
OWNID       0
GRPID       0
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

PSET        10
SPU_LIST    9    10   11
OWNID       0
GRPID       3
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

PSET        11
SPU_LIST    5    6    7    8
OWNID       0
GRPID       3
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET
```

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```
#
```

Destroy Pset 10 because it is no longer needed. Its processors (9, 10, and 11) are assigned back to the default processor set (Pset 0). Then list the new Pset configurations using the `psrset -i` command.

```
# psrset -d 10
successfully destroyed pset 10
# psrset -i
PSET        0
SPU_LIST    0    1    2    3    4    9    10   11
OWNID       0
GRPID       0
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

PSET        11
SPU_LIST    5    6    7    8
OWNID       0
GRPID       3
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

#
```

Assign processors 4 and 9 to Pset 11 using the `psrset -a...` command. Then list the new Pset configurations using `psrset -i`, which shows the processor assignments for all Psets (Pset 0 and Pset 11).

```
# psrset -a 11 4 9
successfully assigned processor 4 to pset 11
successfully assigned processor 9 to pset 11
# psrset -i
PSET        0
SPU_LIST    0    1    2    3    10   11
OWNID       0
GRPID       0
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
```

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```
EMPTY       FAIL
LASTSPU     DFLTPSET

PSET        11
SPU_LIST    4    5    6    7    8    9
OWNID       0
GRPID       3
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

#
```

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**Example 9-3 Running and Binding Programs in Psets**

List the current Pset configuration for the local nPar. Two Psets are configured: Pset 0 and Pset 2.

Note that processor ID 10 is not active in this nPartition (because iCOD software has deactivated it).

```
# psrset -i
PSET        0
SPU_LIST    0    2    9
OWNID       0
GRPID       0
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

PSET        2
SPU_LIST    1    3    4    5    6    7    8    11
OWNID       0
GRPID       3
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

#
```

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Use the mpsched command to run the "potato" program and bind it to processor ID 2. Then use the psrset -q... command to list the Pset binding for "potato" (process ID 10368); "potato" is bound to Pset 0.

```
# mpsched -c 2 ./potato -n 7
Pid 10368: bound to processor 2 using the default process launch policy
Threads = 7
tid = 2  cpu = 2
tid = 3  cpu = 2
tid = 4  cpu = 2
tid = 5  cpu = 2
tid = 6  cpu = 2
tid = 7  cpu = 2
tid = 1  cpu = 2

# psrset -q 10368
PID  10368    PSET  0
#
```

Use the psrset -b... command to change the Pset binding for "potato" to Pset 2. Then use psrset -q... to confirm that it is bound to Pset 2, and use the mpsched -q... command to check its processor binding.

```
# psrset -b 2 10368
successfully bound pid 10368 to pset 2
# psrset -q 10368
PID  10368    PSET  2
# mpsched -q -p 10368
Pid 10368: bound to processor 3 using the default process launch policy
#
```

Use the sar command to list the current nPar's processor usage, including Pset details. Note that processor ID 3 in (Pset 2) is heavily loaded by the "potato" program.

```
# sar -u -M -P 1

HP-UX feshd5a B.11.11 U 9000/800    10/23/01

00:17:11    pset     cpu    %usr    %sys    %wio   %idle
00:17:12       0       0       0       0       7      92
               2       1       0       0      10      90
               0       2       0       0       8      92
               2       3     100       0       0       0
               2       4       0       0       4      96
               2       5       0       0       8      92
               2       6       0       0       7      93
               2       7       0       0       9      91
```

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```
                2       8       0       0       5      95
                0       9       0       1       9      90
                2      11       0       0       8      92
                   system       9       0       7      84
#
```

Use the `mpsched -u...` command to *unbind* the "potato" program (process ID 10368) from processor ID 3, to allow the program's threads to migrate to other processors in the Pset to which it is bound.

Then use `sar` to list the local nPar's current processor usage, including all processor and Pset details.

Since the "potato" program was unbound from processor 3, its threads were able to migrate to the other processors in the Pset to which it "potato" is bound (Pset 2).

All processors in Pset 2 are being used fairly heavily, while processors in Pset 0 are 100% idle. This is due to Pset processor resource isolation: by default each program only uses processors in the Pset in which it is run. (The Pset programming interface can override this default to launch threads and processes in other Psets, given the right conditions.)

```
# mpsched -u -p 10368
Pid 10368: not bound using the default process launch policy
# sar -u -M -P 1

HP-UX feshd5a B.11.11 U 9000/800    10/23/01

00:24:26    pset     cpu    %usr    %sys    %wio   %idle
00:24:27       0       0       0       0       0     100
               2       1     101       0       0       0
               0       2       1       0       0     100
               2       3     101       0       0       0
               2       4     100       1       0       0
               2       5      96       0       0       5
               2       6     101       0       0       0
               2       7     101       0       0       0
               2       8      18       2       0      81
               0       9       0       1       0     100
               2      11      88       0       0      13
                  system      64       0       0      36
#
```

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**Example 9-4 Managing Pset Permissions and Attributes**

This example modifies Pset owner, group, and access permissions; lists various Pset details; and includes other sample Pset uses by various users on the system.

Use `psrset -i` to list the current Pset configuration for the local nPartition. Three Psets are configured: Pset 0, Pset 7, and Pset 8.

```
# psrset -i
PSET        0
SPU_LIST    0    1    2    3    4    5
OWNID       0
GRPID       0
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

PSET        7
SPU_LIST    9    10   11
OWNID       0
GRPID       3
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

PSET        8
SPU_LIST    6    7    8
OWNID       0
GRPID       3
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

#
```

Modify the group setting for Pset 8 to be group ID 20. Also use `psrset -t...` to modify the permissions for Pset 8. Setting the permissions to 774 allows the owner (`root`) and users in group ID 20 (the group named `users`) to execute, write, and read Pset 8; all others can only read details about the Pset's configuration.

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```
# psrset -t 8 GRPID=20
# psrset -t 8 PERM=774
#
```

Using the `psrset -t...` command, change the owner for Pset 7 to user ID 103 (the user named ann).

```
# psrset -t 7 OWNID=103
#
```

Now ann uses the `id` command to list the user ID and group memberships for her user account. She then lists the current Pset configuration for the local nPartition.

The ann user account gives her execute and read access to Pset 0, ownership of Pset 7 (including execute, write, and read access), and execute, write, and read access for Pset 8.

She is considerd one of the “others” (access permissions 5) for Pset 0, the owner (user ID 103, with access permissions 7) for Pset 7, and a group member (group ID 20, access permission 7) for Pset 8.

```
ann $ id
uid=103(ann) gid=20(users) groups=102(prog)
ann $ psrset -i
PSET        0
SPU_LIST    0    1    2    3    4    5
OWNID       0
GRPID       0
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

PSET        7
SPU_LIST    9    10   11
OWNID       103
GRPID       3
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

PSET        8
SPU_LIST    6    7    8
OWNID       0
```

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```
GRPID       20
PERM        774
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

ann $
```

Because ann is the owner for Pset 7, she has authority to modify the Pset's user, group, and access permissions attributes.

Using the `psrset -t...` command, ann sets the group for Pset 7 to 102 (the group named `prog`). Another `psrset -t...` command sets access permissions for Pset 7 to 770, which gives the owner (ann) and `prog` group members access to execute, write, and read the Pset. All others have no permissions to use or read Pset 7.

```
ann $ psrset -t 7 GRPID=102
ann $ psrset -t 7 PERM=770
ann $
```

Now ann assigns processor ID 8 to Pset 7, using the `psrset -a...` command.

Processor 8 was assigned to Pset 8, but ann can reassign it because she has write permission for Pset 8 (she is a member of group ID 20, which has execute, write, and read permissions).

Likewise, ann can assign the processor to Pset 7 because she has write permissions there (she is the owner, and has execute, write, and read permissions).

Then ann lists the new configurations for Pset 7 and Pset 8 using the `psrset -i 7 8` command.

```
ann $ psrset -a 7 8
successfully assigned processor 8 to pset 7
ann $ psrset -i 7 8
PSET        7
SPU_LIST    8    9    10   11
OWNID       103
GRPID       102
PERM        770
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET
```

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```
PSET        8
SPU_LIST    6    7
OWNID       0
GRPID       20
PERM        774
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

ann $
```

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Now a different user in the same nPartition attempts to list and use the new Pset configurations.

This user, `joe`, lists his user ID and the IDs for the groups to which he belongs, and then lists all Pset configurations using the `psrset -i` command. Note that because `joe` does not have read permission for Pset 7 he cannot view its attribute values (he is not the owner or a member of the Pset's group, so as one of the "others" he has no permissions).

```
joe $ id
uid=102(joe) gid=20(users)
joe $ psrset -i
PSET        0
SPU_LIST    0    1    2    3    4    5
OWNID       0
GRPID       0
PERM        755
IOINTR      ALLOW
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

PSET        7
SPU_LIST    8    9    10   11
psrset: no privileges for query operation on this pset

PSET        8
SPU_LIST    6    7
OWNID       0
GRPID       20
PERM        774
IOINTR      ALLOW
```

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```
NONEMPTY    DFLTPSET
EMPTY       FAIL
LASTSPU     DFLTPSET

joe $
```

When `joe` uses the `psrset -e 7...` command to attempt to execute the "potato" program in Pset 7 he cannot because he does not have execute permission in the Pset.

However, when `joe` uses the `psrset -e 8...` command to execute "potato" in Pset 8 the program is run in that Pset. He can run programs in Pset 8 because he is a member of group ID 20 and members of that group have execute, write, and read permission for the Pset.

```
joe $ psrset -e 7 ./potato
psrset: no privileges to perform operation
joe $ psrset -e 8 ./potato
Threads = 2
tid = 1  cpu = 6
tid = 2  cpu = 7
...
```

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